

Contents

Repair Instructions – Electronic Components

1	Power Supply Unit	6
1.1	Output Voltages	6
1.1.1	Sub D Socket Configuration	7
1.1.2	Voltage Measurement	8
1.2	Replacing the Power Supply Unit	9
1.3	Retrofitting the Optional DC Module	11
1.4	Replacing the Optional Rechargeable Battery	16
2	CPU 68332 PCB	18
2.1	Power Supply to the CPU 68332 PCB	18
2.2	Service LEDs on the CPU 68332 PCB	20
2.3	Replacing the Battery on the CPU 68332 PCB	21
2.4	Replacing the Real-Time Clock on the CPU 68332 PCB	22
2.5	Replacing the CPU 68332 PCB	23
2.6	Test Possible in DS Mode	24
2.6.1	Diagnosis Mode	24
2.6.2	External DS Mode Using PC	24
2.7	Conversions	25
2.7.1	Retrofitting of CPU 68332 PCB as per IDM No. 6	25
3	Communication PCB (Optional)	26
3.1	Power supply to the Communication PCB	26
3.2	Communication PCB Connector Pin Assignment	26
3.3	Replacing the Communication PCB	29
3.4	Tests possible in DS mode	30
3.4.1	Diagnosis mode	30

Contents

3.4.2	External DS mode using PC	30
4	Paediatric Flow PCB Option for Evita 4 as of SW 2.20	31
4.1	Power Supply to the Paediatric Flow PCB	31
4.2	Connector Pin Assignment of the Paediatric Flow PCB	31
4.3	Replacing the Paediatric Flow PCB	33
5	CO2 Carrier PCB	34
5.2	CO2 Carrier PCB Connector Pin Assignment	35
5.3	Replacing the CO2 Carrier PCB	38
5.4	Tests possible in DS mode	38
5.4.1	Diagnosis mode.....	38
5.4.2	External DS mode using PC.....	38
5.5	Conversions	39
5.5.1	Replacing CO2 Carrier PCB According to IDM No. 3 (Evita 4)	39
5.5.2	Conversion due to Error Message "Ext. Battery reversed poles" IDM No. 2 (Evita 2 dura) or IDM No. 19 (Evita 4)40	
5.5.3	Conversion for Device Error 02.71.003 IDM No. 2 (Evita 2 dura) or IDM No. 19 (Evita 4)41	
6	Power Supply PCB (CO₂ measurement)	42
6.1	Power Supply to the Power Supply PCB	42
6.2	Connector Pin Assignment on the Power Supply PCB	42
6.3	Measuring the Voltages on the Power Supply PCB	43
6.3.1	Printed Circuit Board on Extender Board.....	43
6.3.2	Printed Circuit Board in the Evita.....	43
6.4	Test Points on the Power Supply PCB	44
6.5	Replacing the Power Supply PCB	45

Contents

7	Processor Board PCB (CO₂ measurement)	46
7.1	Power Supply to the Processor Board PCB	46
7.2	Connector Pin Assignment of the Processor Board PCB	46
7.3	Replacing the Processor Board PCB	48
8	CO₂ Measurement	49
8.1	Fault Diagnosis Chart	49
8.2	CO ₂ Sensor	50
9	SpO₂ Module (Optional)	51
10	Graphics Controller PCB Evita 4	52
10.1	Power Supply to the Graphics Controller PCB	52
10.2	Connector Pin Assignment of the Graphics Controller PCB	52
10.3	Replacing the Graphics Controller PCB	57
10.4	Tests possible in DS mode	58
10.4.1	Diagnosis mode.....	58
10.4.2	External DS mode using PC.....	58
11	Display with DC/AC converter for backlighting Evita 4	59
11.1	Power Supply to the Display	60
11.2	Connector Pin Assignment of the Display	60
11.3	Replacing the Display	61
11.4	Testing DC/AC converter for backlighting	63
11.5	Tests possible in DS mode	63
11.5.1	Diagnosis mode.....	63
11.5.2	External DS mode using PC	63

Contents

12	Backlighting Evita 4	64
12.1	Toshiba Display (1995 or later), Version 1	64
12.1.1	Power Supply to the Backlighting	64
12.1.2	Replacing the Backlighting.....	65
12.2	NEC Display (1996 or later), Version 2	66
12.3	Sharp Display (1996 or later), Version 3	66
12.4	Toshiba Display (1997 or later), Version 0	66
13	Touchscreen/Window Evita 4	67
13.1	Power Supply to the Touchscreens	67
13.2	Replacing the Touchframe	68
13.3	Tests possible in DS mode	69
13.3.1	Diagnosis mode.....	69
13.3.2	External DS mode using PC.....	69
13.4	Replacing the Window	69
14	7-Segment PCB Evita 2 dura	71
14.1	Voltage Supply to the 7-Segment PCB	71
14.1.1	X1 Connector on the 7-Segment PCB.....	71
14.2	7-Segment PCB Repair Information	71
14.3	7-Segment PCB Component Layout Diagram	72
15	Frontpanel PCB Evita 2 dura	73
15.1	Voltage Supply to the Frontpanel PCB	73
15.1.1	X1 Connector on the Frontpanel PCB to the Electronics.....	73
15.2	Voltage Supply to Peripheral Equipment	73
15.2.1	X2 Connector on the Frontpanel PCB to the 7-Segment PCB	73
15.2.2	X3 Connector on the Frontpanel PCB to the Membrane Keyboard. 73	

Contents

15.2.3	X5 Connector on the Frontpanel PCB to the Control Knob	74
15.2.4	X7 Connector on the Frontpanel PCB to the display.....	74
15.2.5	X9 Connector on the Frontpanel PCB to the DC/AC Transformer...	74
15.3	Front Panel PCB Repair Information	74
15.4	Frontpanel PCB Component Layout Diagram	75
16	Pneumatics Controller PCB	76
16.1	Power Supply to the Pneumatics Controller PCB	76
16.2	Connector Pin Assignment of the Pneumatics Controller PCB	76
16.3	Replacing the Pneumatics Controller PCB	84
16.4	Tests possible in DS mode	85
16.4.1	Diagnosis mode.....	85
16.4.2	External DS mode using PC.....	85
17	HPSV Controller PCB	86
17.1	Power Supply to the HPSV Controller PCB	86
17.2	Replacing the HPSV Controller O ₂ /AIR PCB	88
17.3	Notes Relating to Trouble Shooting	89
17.4	Tests possible in DS mode	89
17.4.1	Diagnosis mode.....	89
17.4.2	External DS mode using PC.....	89

Repair Instructions – Electronic Components

1 Power Supply Unit

1.1 Output Voltages

The power supply unit provides the following output voltages:

- +24 V
- +15 V
- -15 V
- +12 V
- +5 V.

The output voltages and other signals are available at a Sub D socket (Extensionbox). This Sub D socket is located on the rear panel.

Important: With devices manufactured end of 96 or later, the extension box connector is no longer available. The voltages must therefore be measured on the Pneumatics Controller PCB at pins X3, X11, and X21.

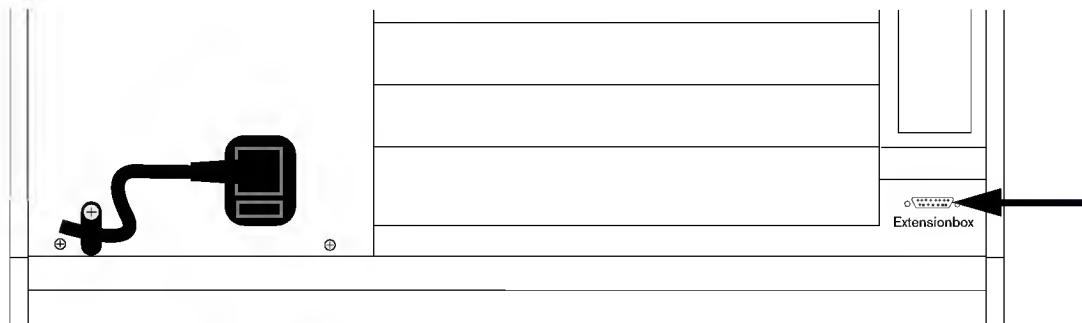


Fig. 1: Rear view (Sub D socket)

1.1.1 Sub D Socket Configuration

Pin	Assignment	Pin	Assignment
1	+24 V –1680 mV +720 mV	5	+5 V, 15 V \pm 77.3 mV
2	+15 V \pm 450 mV	7	Shield
3	AGND	9	+12 V \pm 240 mV
4	DGND	10	–15 V \pm 450 mV

Important: The voltages can be read out in diagnosis mode refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 3.3.2, Diagnosis page "Microprocessor" of "Electronics", page 70. or with external DS mode using PC refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.4.1, Testing voltages, page 138. and refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.4.2, Power pack status, page 140.

1.1.2 Voltage Measurement

Important: With devices manufactured end of 96 or later, the extension box connector is no longer available. The voltages must therefore be measured on the Pneumatics Controller PCB at pins X3, X11, and X21.

The voltages +5 V and +24 V are connected to digital ground (pin 4). The voltages +15 V, -15 V, and +12 V are connected to analog ground (Pin 3).



IMPORTANT

The +5 V voltage is only stable under load. At no-load, the voltage is affected by interfering pulses. These interfering pulses may cause voltage peaks in the measured value display. Measure the +5 V voltage only under load.

Example of a voltage measurement:

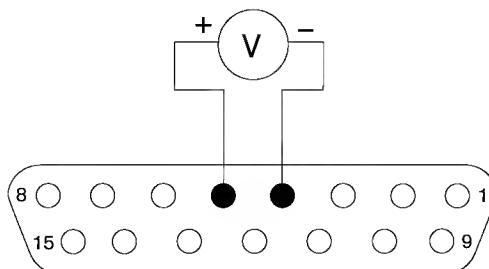


Fig. 2: Sub D socket

- If no voltages are present, check the mains fuses on the rear panel (if the +24 V voltage is not present, check the control unit for short circuit).

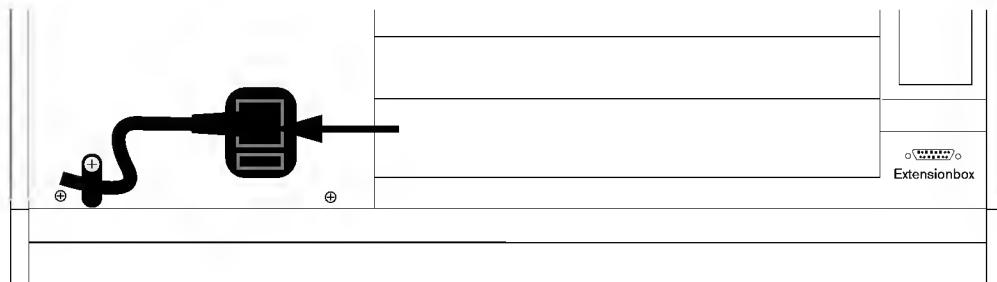


Fig. 3: Rear view (mains fuses)

1.2 Replacing the Power Supply Unit

Replace the complete power supply unit as follows:

- Disconnect the power plug from the socket-outlet.
- Remove the plastic screws **A** from the left and right side panels of the Evita.
- Remove the cover.

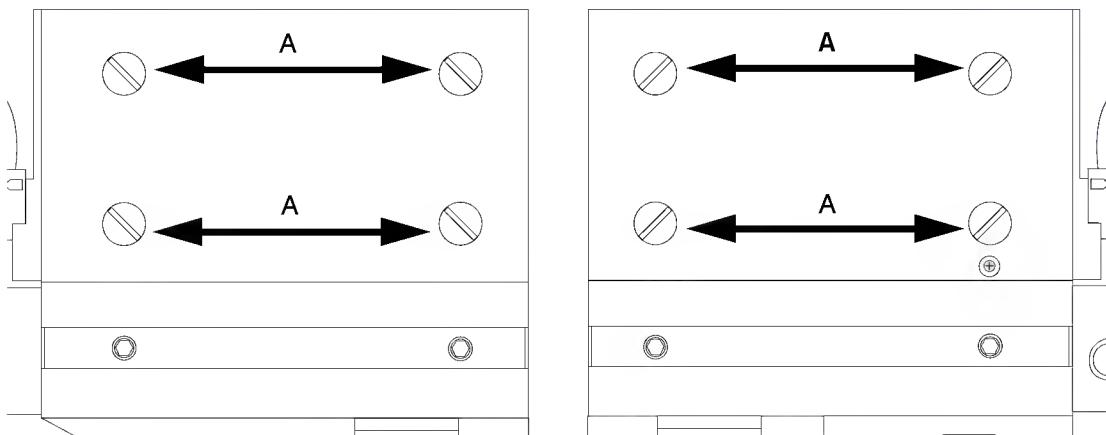


Fig. 4: Side views (removing the power supply unit, step 1)

- Remove the cord grip **B**.
- Remove the power cord **C**.

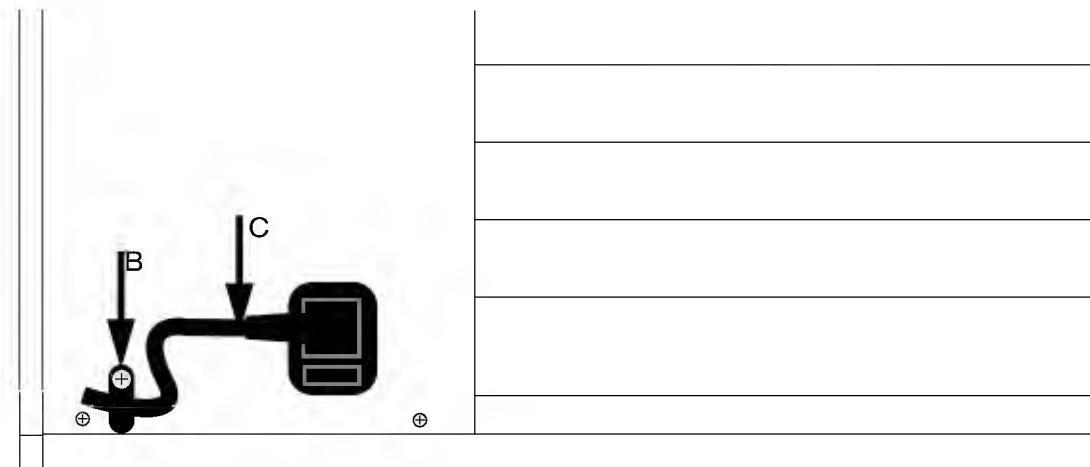


Fig. 5: Rear view (removing the power supply unit, step 2)

- Remove the Phillips screws **E**.

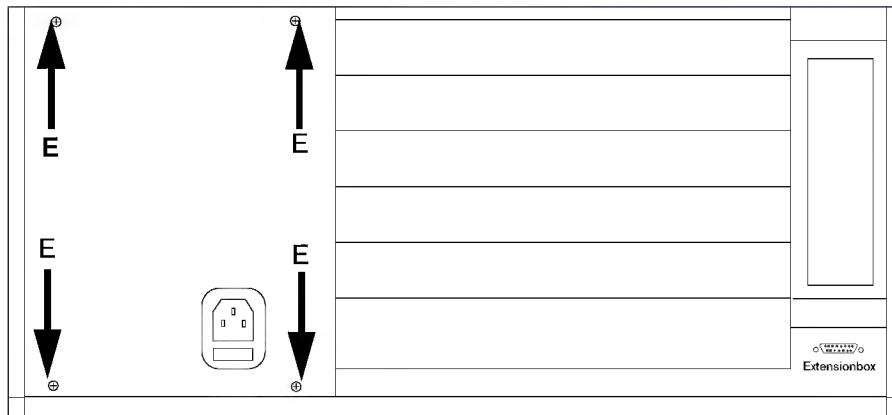


Fig. 6: Rear view (removing the power supply unit, step 3)

- Slide the power supply unit out of the Evita (from the rear).
- Mount the new power supply unit by following the reverse method used for dismantling.
- Switch the Evita on and allow it to warm up for 10 minutes.
- Check the electrical safety of the Evita (perform VDE test).

IMPORTANT

If a DC module is available in the Evita, you cannot measure the equivalent leakage current as with a normal Evita. Before measuring the equivalent leakage current, perform the following steps:

- Disconnect the power plug from the socket-outlet.
- Remove the external battery, if available.
- Switch the Evita on.
- Wait until the internal battery is discharged (the Evita goes off after approx. 10 to 15 minutes).
- Connect the Evita to the VDE portable measuring set.

IMPORTANT

If the Evita is supplied with voltage from the mains supply, you cannot measure the equivalent leakage current. **DO NOT** supply the Evita with mains voltage. **DO NOT** press the "run" button on the VDE portable measuring set.

- Measure the equivalent leakage current using the VDE portable measuring set.

1.3 Retrofitting the Optional DC Module

- Disconnect the power plug from the socket-outlet.
- Remove the power supply unit.
- Remove the nuts **A**.
- Remove the cover plate **B**.

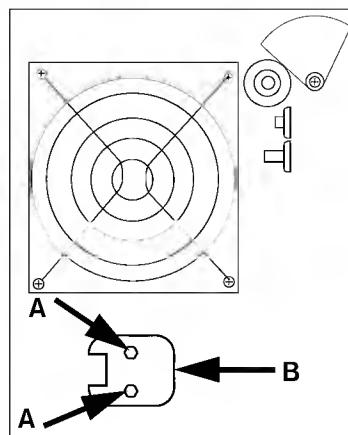


Fig. 7: Removing the cover plate

- Remove the screws **C** at the top and the bottom of the power supply unit.

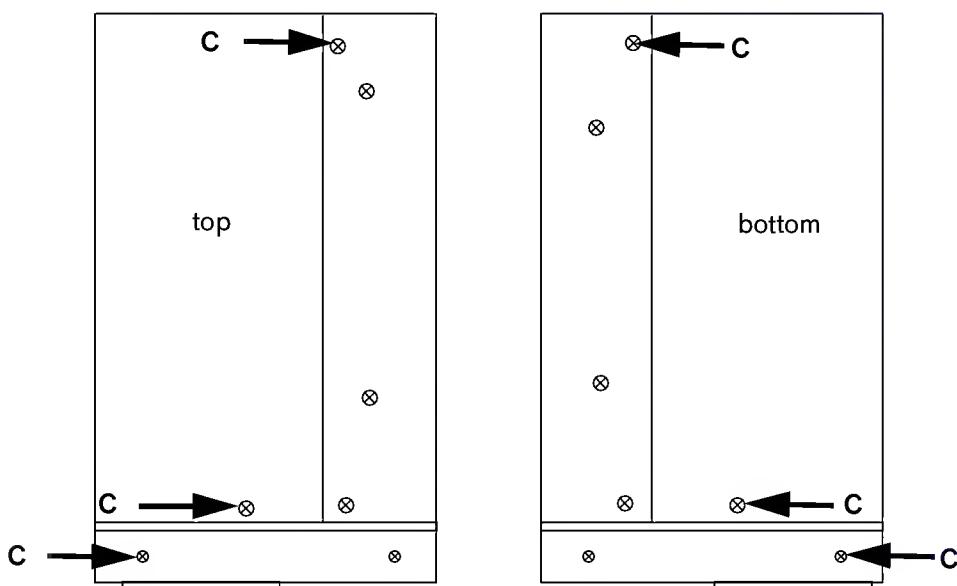


Fig. 8: Disassembling the empty housing of the power supply unit

- Remove the empty housing.
- Disconnect the connectors **D** (on 2 single black cables coming from the mains filter) from the power supply unit basic board and connect them to the battery module.

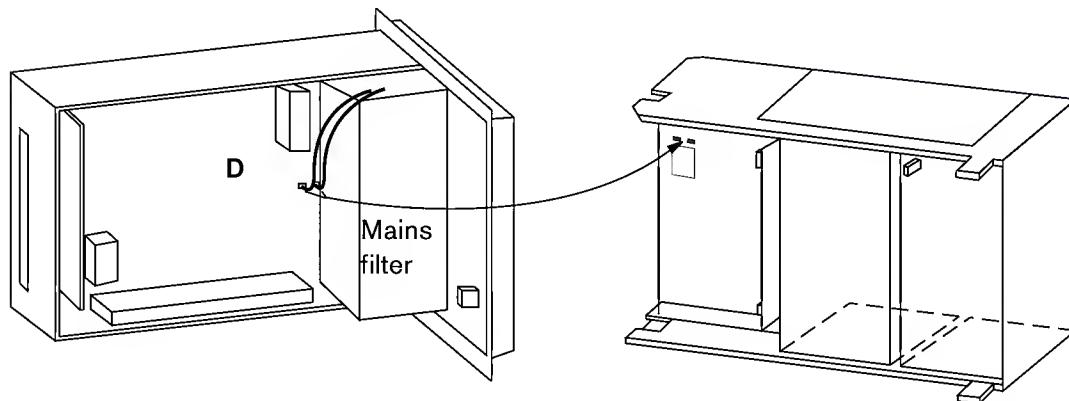


Fig. 9: Connections between the power supply unit and the DC module (part 1)

- Connect the 2-core cable **E** (with 3-pin plug housing) to the battery module. The connector of the cable must be plugged onto the pins of the battery module such that the retaining clamp engages firmly (the retaining clamp is located above the cut pin). The 2-core cable **E** is located on older power supply units at the mains filter and is secured with a cable tie. With newer power supply units the cable is "parked" on the PCB in the power supply unit on a connector.

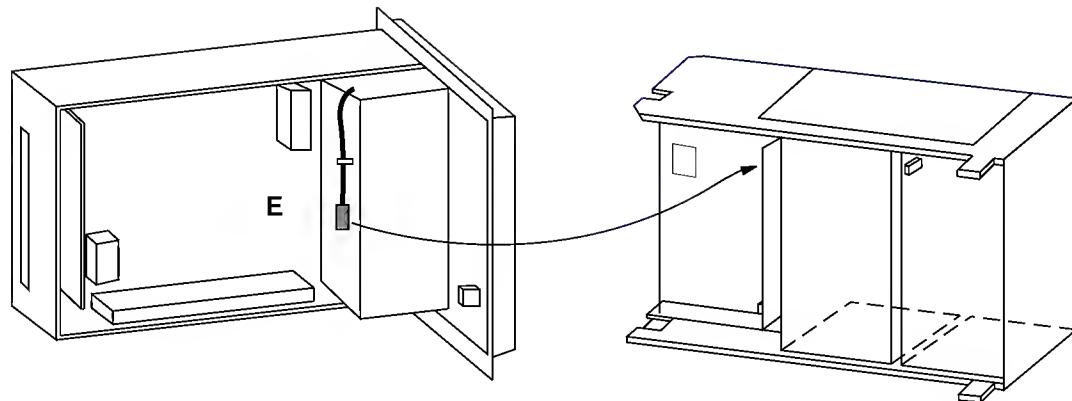


Fig. 10: Connections between the power supply unit and the DC module (part 2)

- Connect the green 8-pin connector **F** to the power supply unit basic board.
- Connect the red 10-pin connector **G** to the power supply unit basic board.
Attention: Observe encoding pin.

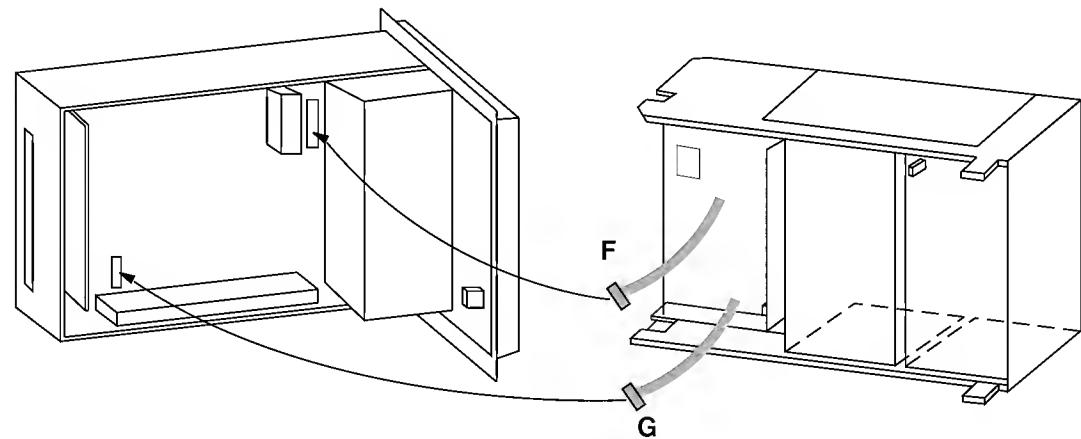


Fig. 11: Connections between the power supply unit and the DC module (part 3)

- Thread the red 2-pin connector **H** through the opening on the front panel. The red cable of the 2-pin red connector must point upwards (+).

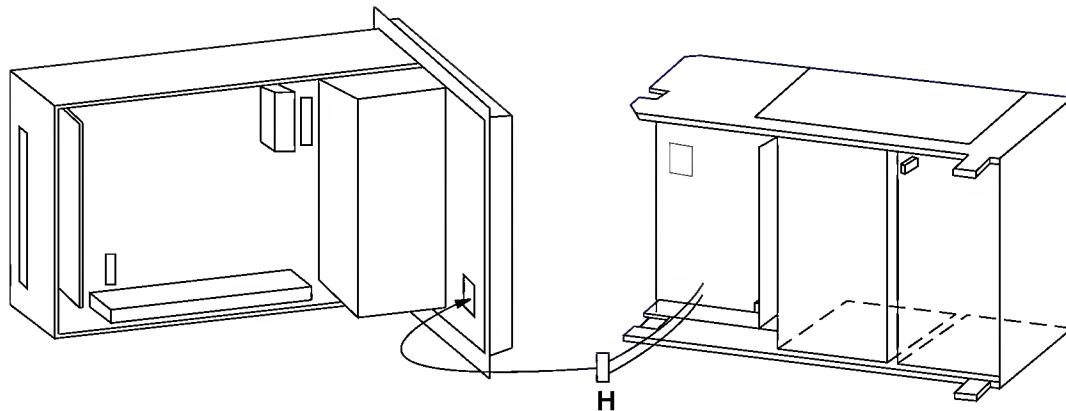


Fig. 12: Connections between the power supply unit and the DC module (part 4)

- Open the battery compartment.
- Plug the battery terminal into the battery compartment.

**DANGER**

Hazardous voltages present. DO NOT plug the battery terminal into the battery.

- Mount the DC module by following the reverse method used for dismounting of the empty housing.

**CAUTION**

Kinked or squeezed cables may cause short-circuits. DO NOT kink or squeeze cables during reassembly.

- Slide the cover plate **B**, noses first, over the red 2-pin connector **H**.
- Secure the cover plate.

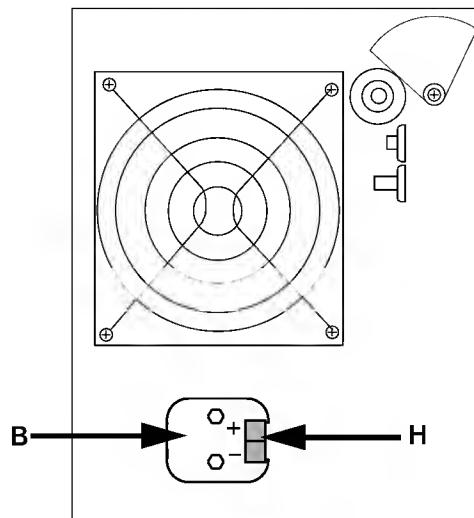


Fig. 13: Mounting the cover plate

- Connect the battery terminal to the battery.
- Mount the cover of the battery compartment.
- Mount the power supply unit.
- Switch the Evita on.
- Enable the "DC module" option by entering "4811".
- Check the Evita by following the instructions in the Evita 4/Evita 2 dura Test Certificate.

IMPORTANT:

If the Evita should not start, the batteries might be exhausted. Connect the Evita to the power supply and allow the batteries to recharge (several hours).

1.4 Replacing the Optional Rechargeable Battery

To replace the optional rechargeable battery, proceed as described below:

- Disconnect the power cord from the socket-outlet.
- Remove the power supply unit.
- Remove the Phillips screws A.
- Remove the cover B.

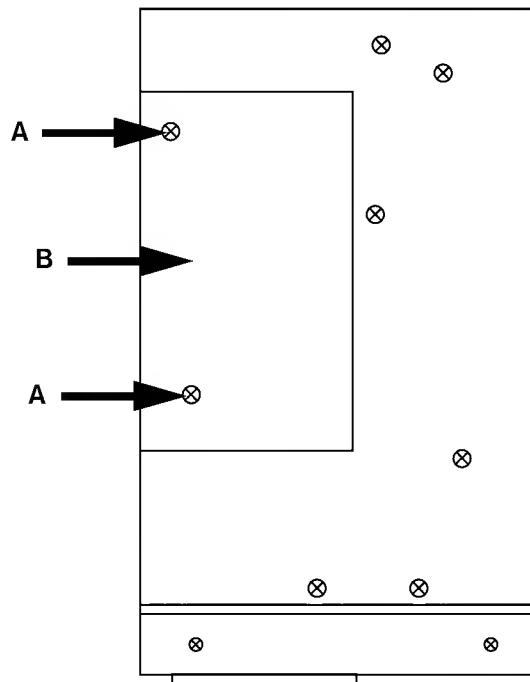


Fig. 14: Power supply unit (viewed from top)

- Remove the connector **C**.
- Remove the batteries **D**.

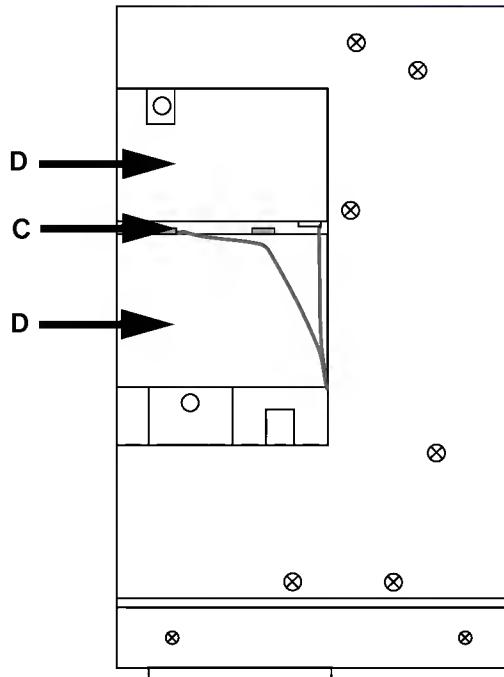


Fig. 15: Replacing the battery in the power supply unit

- Install the new batteries in the power supply unit.



CAUTION

Incorrect polarity may damage the power supply unit and the batteries. When installing new batteries, make sure the polarity is correct.

- Reassemble the power supply unit by following the reverse method used for disassembly.
- Check the Evita by following the instructions in the Evita 4/Evita 2 dura Test Certificate.



IMPORTANT

Exhausted batteries must be charged for several hours during mains operation. Otherwise, malfunctions (relay noise) are possible during DC operation.

2 CPU 68332 PCB



CAUTION

Electrostatic discharge can damage electronic components. Use an ESD protection mat and a wrist strap when handling electronic modules.

2.1 Power Supply to the CPU 68332 PCB

X2 (Power supply only)			
Pin	Assignment	Pin	Assignment
1c	+12 V	8c	AGND
2c	+24 V	15c	DGND
3c	+15 V	16c	+5 V (also at X11)
4c	-15 V		

X11	
Pin	Assignment
1	+5 V supply voltage
3	DGND

X13	
Pin	Assignment
1	+5 V ISO
3	GND ISO

VCC RAM	
Pin	Assignment
32	+5 V (minimum voltage for retention of data: 2 V)
16	DGND

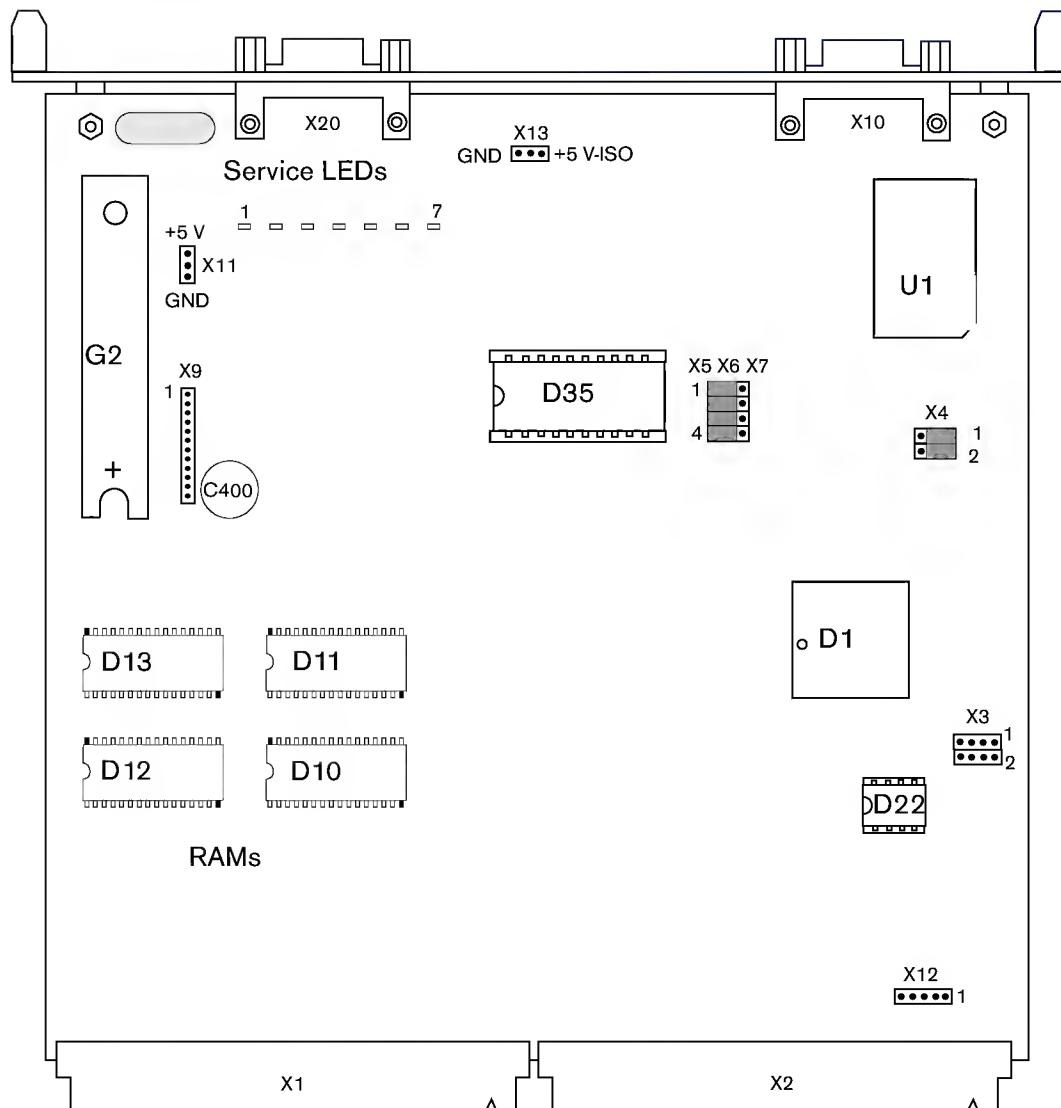


Fig. 16: Components mounting diagram of the CPU 68332 PCB

2.2 Service LEDs on the CPU 68332 PCB

The service LEDs indicate the active reset.

Service LED	Reset	Meaning
1	Ovvoltage	The +5 V voltage is too high.
2	Undervoltage	The +5 V voltage is too low.
3	CPU reset	The CPU resets its own interface system which is located on the CPU 68332 PCB, or the CPU is reset.
4	Reset up	The pneumatics resets the CPU 68332 PCB.
5	Reset down	The CPU resets the pneumatics and the boards on the motherboard.
6	Display reset	The CPU resets the control unit.
7	Pneumatics disabled	This signal is initialized if the pneumatics is not functioning properly. It will remain active until the pneumatics functions properly again.

2.3 Replacing the Battery on the CPU 68332 PCB

- Switch the Evita on and allow it to warm up for 2 minutes (in order to charge the capacitor for power supply to the RAMs).



IMPORTANT

Data loss will occur if the RAM supply voltage is not present. Replace the battery within one minute's time. Pay attention to correct polarity when installing the battery.

- Write down the customer-specific settings (alarm limits, screen layout, etc.) for later entry in case they get lost.
- Switch the Evita off.
- Remove the CPU 68332 PCB.
- Remove the battery.

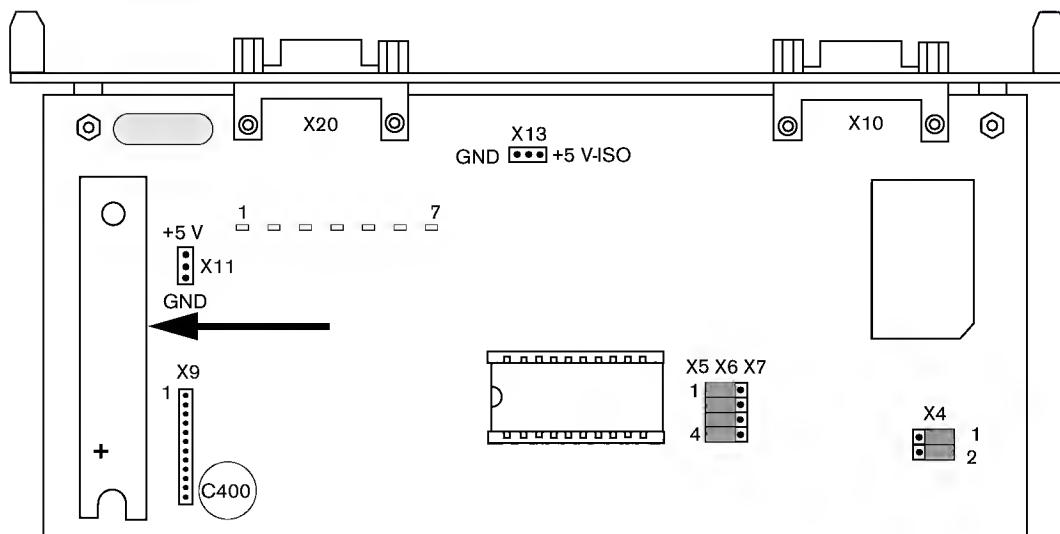


Fig. 17: Component mounting diagram CPU PCB (replacing the battery)

- Place the new battery into the battery mount.
- Install the CPU 68332 PCB in the Evita.
- Secure the CPU 68332 PCB with the screws.
- Check the Evita by following the instructions in the Evita 4/Evita 2 dura Test Certificate.

2.4 Replacing the Real-Time Clock on the CPU 68332 PCB

- Switch the Evita off.
- Remove the CPU 68332 PCB.
- Remove the real-time clock (D35).

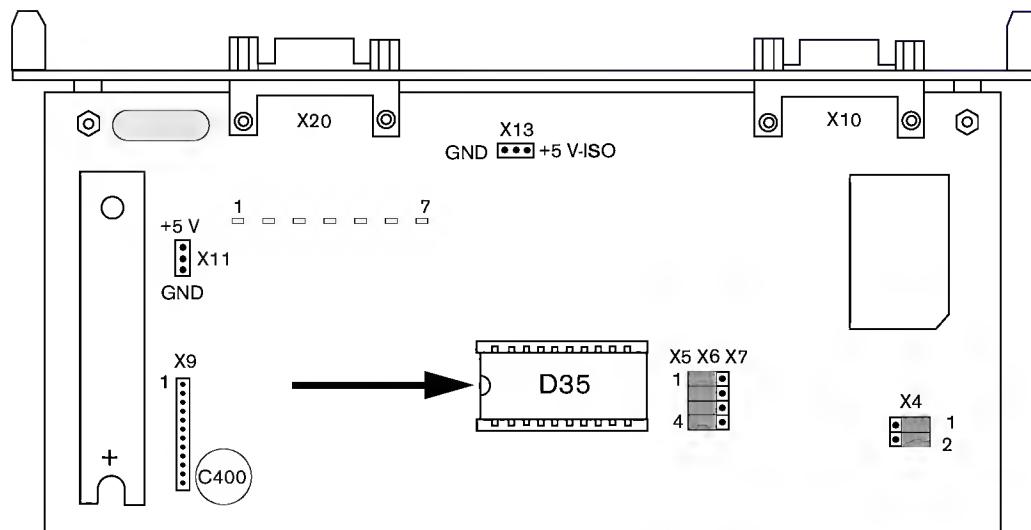


Fig. 18: Component mounting diagram CPU PCB (replacing the real-time clock)

- Insert the new real-time clock into the IC socket.
- Install the CPU 68332 PCB in the Evita.
- Secure the CPU 68332 PCB with the screws.
- Switch the Evita on.
- Adjust time and date.
- Check the Evita by following the instructions in the Evita 4/Evita 2 dura Test Certificate.

2.5 Replacing the CPU 68332 PCB

- Switch the Evita off.
- Remove the CPU 68332 PCB.
- Remove the battery from the old CPU 68332 PCB.
- Remove the D22 module (EEPROM) from the old CPU 68332 PCB.
- Remove the D22 module (EEPROM) from new CPU 68332 PCB.

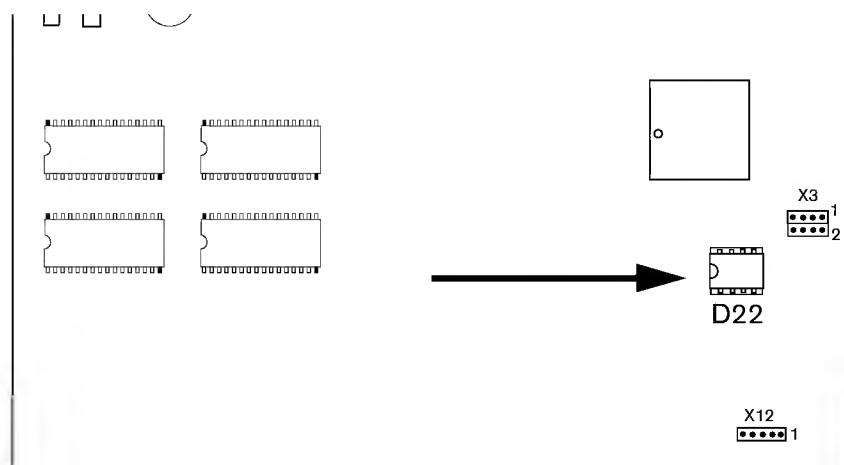


Fig. 19: Component mounting diagram of the CPU PCB (replacing the CPU PCB)

- Install the battery in the new CPU 68332 PCB.
- Transfer the D22 module from the old CPU 68332 PCB to the new CPU 68332 PCB.
- Check the jumper configuration (see old CPU 68332 PCB or, if necessary, the functional description and the component mounting diagram).
- Install the new CPU 68332 PCB in the Evita.
- Secure the CPU PCB with the screws.
- Load the relevant software into the CPU 68332 PCB.
- Check the Evita by following the instructions in the Evita Test Certificate.

2.6 Test Possible in DS Mode

2.6.1 Diagnosis Mode

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 3.3.2, Diagnosis page "Microprocessor" of "Electronics", page 70.

- EPROM test
- RAM test
- Data loss
- Service connector attached
- CAN
- Software options

2.6.2 External DS Mode Using PC

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.2.2, Readout of Evita software version, page 125.

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.2.4, Error list, page 126.

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.2.5, Readout of identification and released options, page 126.

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.2.6, Readout of elapsed-time meter, page 127.

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.2.7, Internal CAN communication, page 127.

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.4.2, Power pack status, page 140.

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.4.4, CO2 measurement data, page 143.

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.4.5, SpO2 measurement data, page 145.

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.4.6, Horn test, page 147.

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.4.7, Loudspeaker test, page 148.

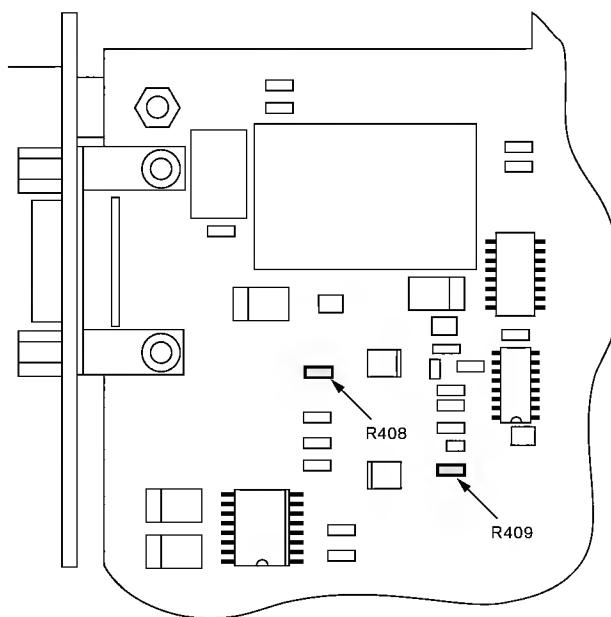
refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.4.10, CPU test, page 149.

2.7 Conversions

2.7.1 Retrofitting of CPU 68332 PCB as per IDM No. 6

- Switch unit off.
- Take ESD protection precautions.
- Disassemble the CPU 68332 PCB.

If the order number 83 06 591 on the adhesive label of the PCB is followed by version number 3.0, the R408 and R409 resistors have to be replaced with 332 ohm resistors (order no. 18 16 144).



- Having done that, mark the version number 3.01 using a waterproof pen.
- Install printed circuit board. Checking electrical safety is not required.

COM1 Test:

- Connect PC as for download and call in download, refer to section of "Repair Instructions - Software Change Report, Download and BD32" chapter 3, Download, page 17. Here only check if connection between the PC and the Evita 4 can be made, i.e. the message "Connected with Evita" will be displayed.
- Conduct an equipment check in standby mode.

3 Communication PCB (Optional)



CAUTION

Electrostatic discharge can damage electronic components. Use an ESD protection mat and a wrist strap when handling electronic modules.

3.1 Power supply to the Communication PCB

X2 (Power supply only)			
Pin	Assignment	Pin	Assignment
1c	+12 V	8c	AGND
2c	+24 V	15c	DGND
3c	+15 V	16c	+5 V
4c	-15 V		

3.2 Communication PCB Connector Pin Assignment

The connectors X1 and X2 are not described in this connector pin assignment. Only a CAN socket and an RS232 socket are specified (the second sockets are comparable).

X3 (CAN socket)	
Pin	Assignment
1	CON-DET1 (recognition for plugged connector)
2	CANL (external CAN bus)
3	GNDISO-2 (ground for CAN interface)
6	GNDISO-2 (ground for CAN interface)
7	CANH (external CAN bus)

X6 (RS232 socket COM2)	
Pin	Assignment
2	RXD-COM2 (RS232 input)
3	TXD-COM2 (RS232 output)
5	GNDISO-1 (ground for RS232 interface)

X10 (Background debug mode interface)	
Pin	Assignment
1	GND (ground)
2	BKPT (BREAK input)
3	GND (ground)
4	FREEZE (status signal from 68332)
5	RESETQ (Reset signal)
6	IFETCH (status signal from 68332)
7	+5 V (operating voltage)
	IPIPE (status signal from 68332)

X13 (ISO2 voltage test connector)	
Pin	Assignment
1	+5 V ISO-2 (operating voltage)
3	GND ISO-2 (ground)

X14 (Operating voltage test connector)	
Pin	Assignment
1	+5 V
2	GND (ground)
3	+15 V
4	VPP (programming voltage)

X20 (Analog output)	
Pin	Assignment
1	GNDISO-3 (ground)
2	AOUT2 (analog output 2)
3	AOUT1 (analog output 1)

X21 (ISO1 voltage test connector)	
Pin	Assignment
1	+5 V ISO-1 (operating voltage)
3	GND ISO-1 (ground)

X22 (ISO3 voltage test connector)	
Pin	Assignment
1	+5 V ISO-3 (operating voltage)
3	GND ISO-3 (ground)

X50 (PROM-EN test connector)	
Pin	Assignment
1	+5 V (operating voltage)
3	PROM-EN-TEST (input for simulation of PROM-EN)

If a jumper is plugged onto X50, the voltage regulator of the processor can be switched to 12 V. The board can be programmed without the external signal PROM-EN.

3.3 Replacing the Communication PCB

- Switch the Evita off.
- Remove the Communication PCB.
- Install the new Communication PCB in the Evita.
- Secure the Communication PCB with the screws.
- Load the corresponding software into the Communication PCB.
- Check the Evita by following the instructions in the Evita Test Certificate.

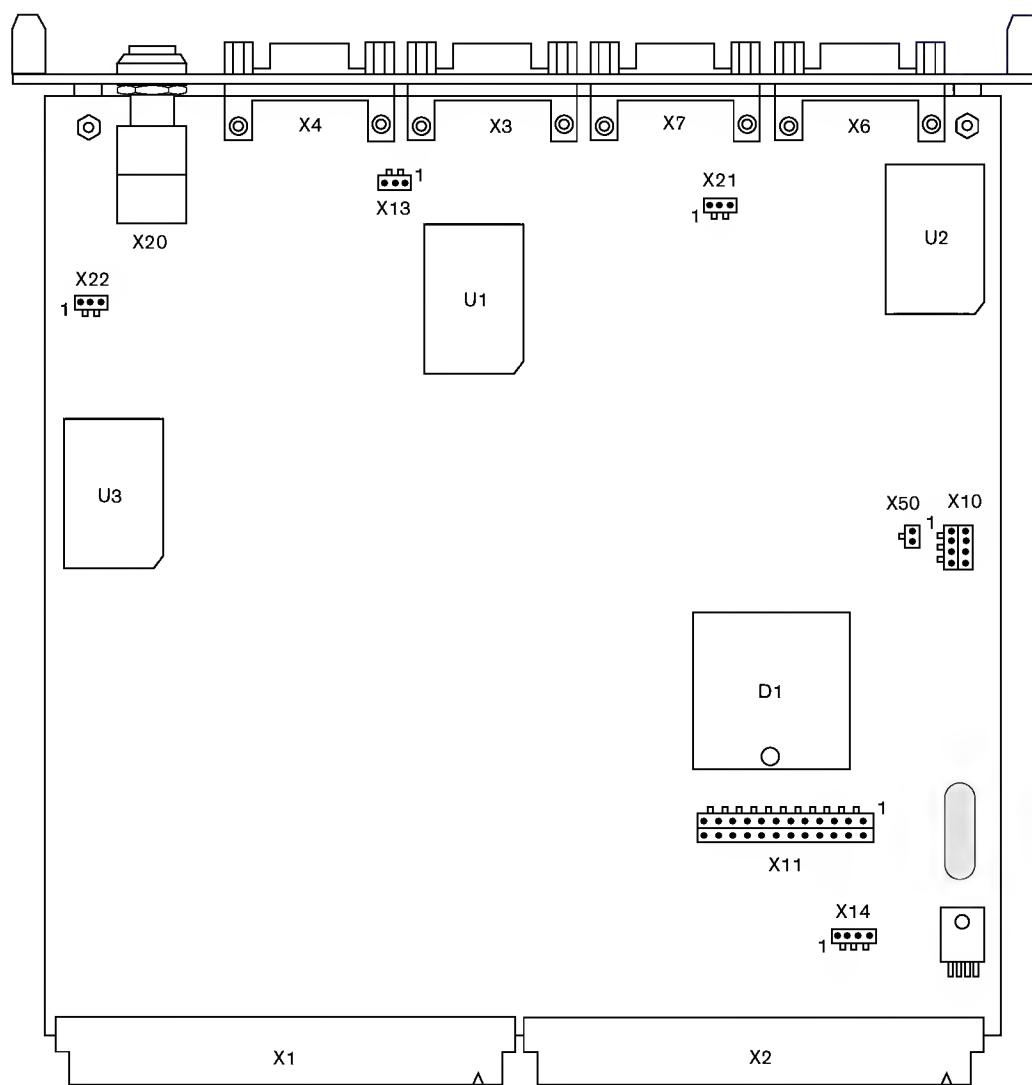


Fig. 20: Component mounting diagram of the Communication PCB

3.4 Tests possible in DS mode

3.4.1 Diagnosis mode

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 3.3.2, Diagnosis page "Microprocessor" of "Electronics", page 70. under "RAM-Comm".

3.4.2 External DS mode using PC

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.6, "Communication" testing (Communication PCB), page 159.

4 Paediatric Flow PCB Option for Evita 4 as of SW 2.20



CAUTION

Electrostatic discharge can damage electronic components. Use an ESD protection mat and a wrist strap when handling electronic modules.

4.1 Power Supply to the Paediatric Flow PCB

X2 (Power supply only)			
Pin	Assignment	Pin	Assignment
1c	+12 V	8c	AGND
2c	+24 V	15c	DGND
3c	+15 V	16c	+5 V
4c	-15 V		

4.2 Connector Pin Assignment of the Paediatric Flow PCB

The connectors X1 and X2 are not considered in this connector pin assignment.

X3 (Flow sensor)			
Pin	Assignment	Pin	Assignment
1	Z-Flow-01	4	Z-Flow-07
2	Z-Flow-03	8	Housing
3	Z-Flow-05	15	Housing

X4 (Analog voltage test)			
Pin	Assignment	Pin	Assignment
1	+15 V-A	4	-15 V-A
2	+5/15 V-B	5	AGND
3	+10 V-A		

X5 (Digital voltage test)

Pin	Assignment	Pin	Assignment
1	+5 V	3	DGND

X12 (Digital voltage test)

Pin	Assignment	Pin	Assignment
1	+5 V-B	3	DGND

4.3 Replacing the Paediatric Flow PCB

- Switch the Evita off.
- Remove the Paediatric Flow PCB.
- Install the new Paediatric Flow PCB in the Evita.
- Secure the Paediatric Flow PCB with the screws.
- Check the Evita by following the instructions in the Evita Test Certificate.

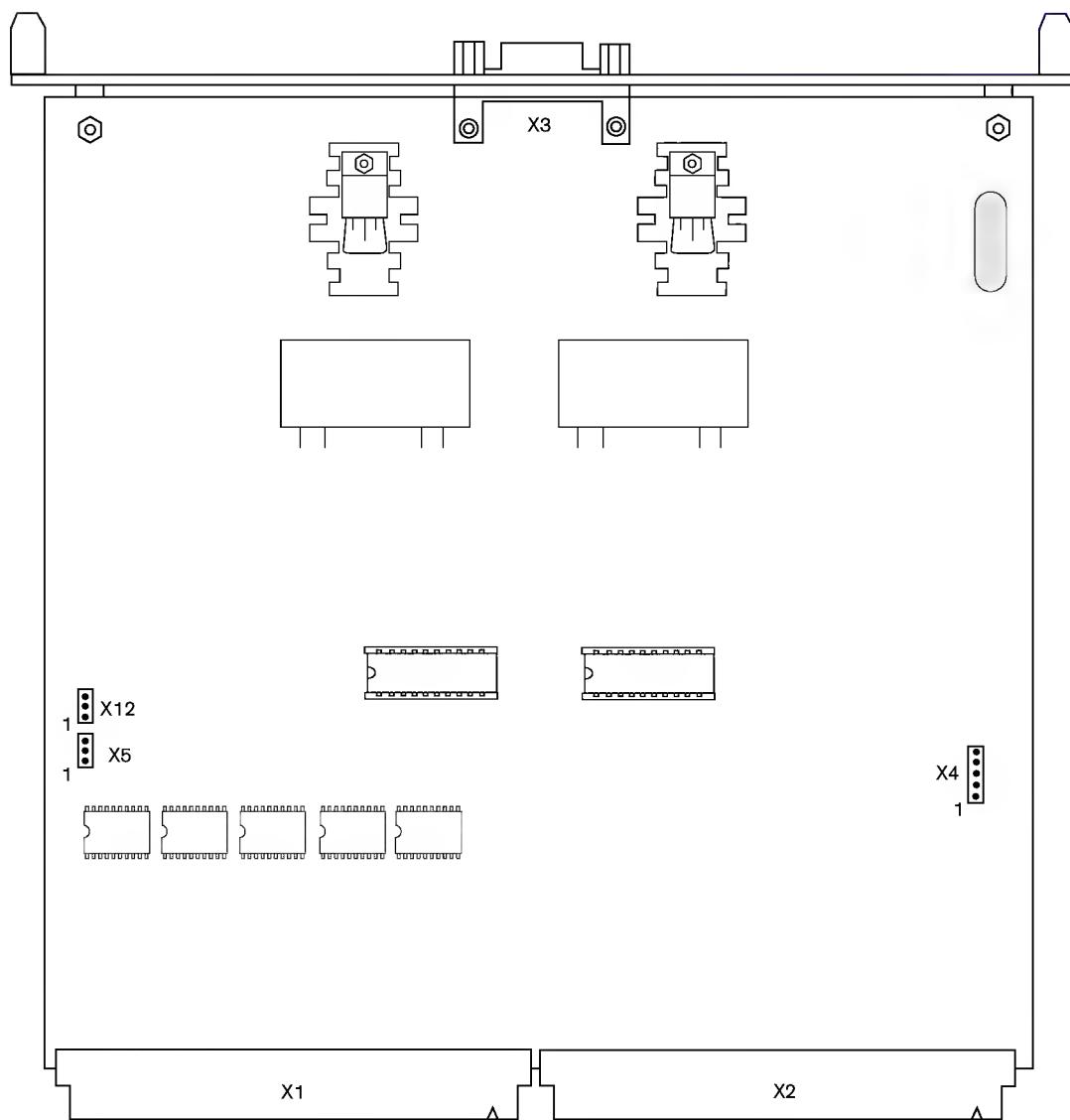


Fig. 21: Component mounting diagram of the Paediatric Flow PCB

5 CO₂ Carrier PCB



CAUTION

Electrostatic discharge can damage electronic components. Use an ESD protection mat and a wrist strap when handling electronic modules.

5.1 Power Supply to the CO₂ Carrier PCB

X2 (Power supply only)			
Pin	Assignment	Pin	Assignment
1c	+12 V	8c	AGND
2c	+24 V	15c	DGND
3c	+15 V	16c	+5 V
4c	-15 V		

Power supply to the temperature hybrid and to the pressure sensor			
Pin	Assignment	Pin	Assignment
1 temperature hybrid	+10 V-A	1 pressure sensor	+10 V-A
4 temperature hybrid	AGND2	3 pressure sensor	AGND2

5.2 CO₂ Carrier PCB Connector Pin Assignment

Connectors X1 and X2 are not considered in the following tables.

X3			
Pin	Assignment	Pin	Assignment
1	+5 V-ISO-1	8	TXD-SpO ₂
2	GND-ISO-1	9	RXD-SpO ₂
3	GND-ISO-1	10	CTS-SpO ₂
4	+15 V-ISO	11	Reset SpO ₂
5	GND-ISO-1	12	GND-ISO-1
6	-15 V-ISO	13	ECG-SYNC (ISO)
7	-15 V-ISO	14	GND-ISO-1

X4			
Pin	Assignment	Pin	Assignment
1	GND-EXT	3	-
2	ECG-SYNC		

X5			
Pin	Assignment	Pin	Assignment
1	GND-ISO-1	3	+15 V-ISO
2	5 V-ISO-1	4	-15 V-ISO1

X8			
Pin	Assignment	Pin	Assignment
1	Temperature sensor		

X9			
Pin	Assignment	Pin	Assignment
1	DGND-ISO-2	5	+5 V-ISO-2
2	Reset-CO ₂	6	-
3	TXD-CO ₂	7	+5 V
4	RXD-CO ₂	8	DGND

X10			
Pin	Assignment	Pin	Assignment
1	+5 V	3	+24 V
2	+12 V		

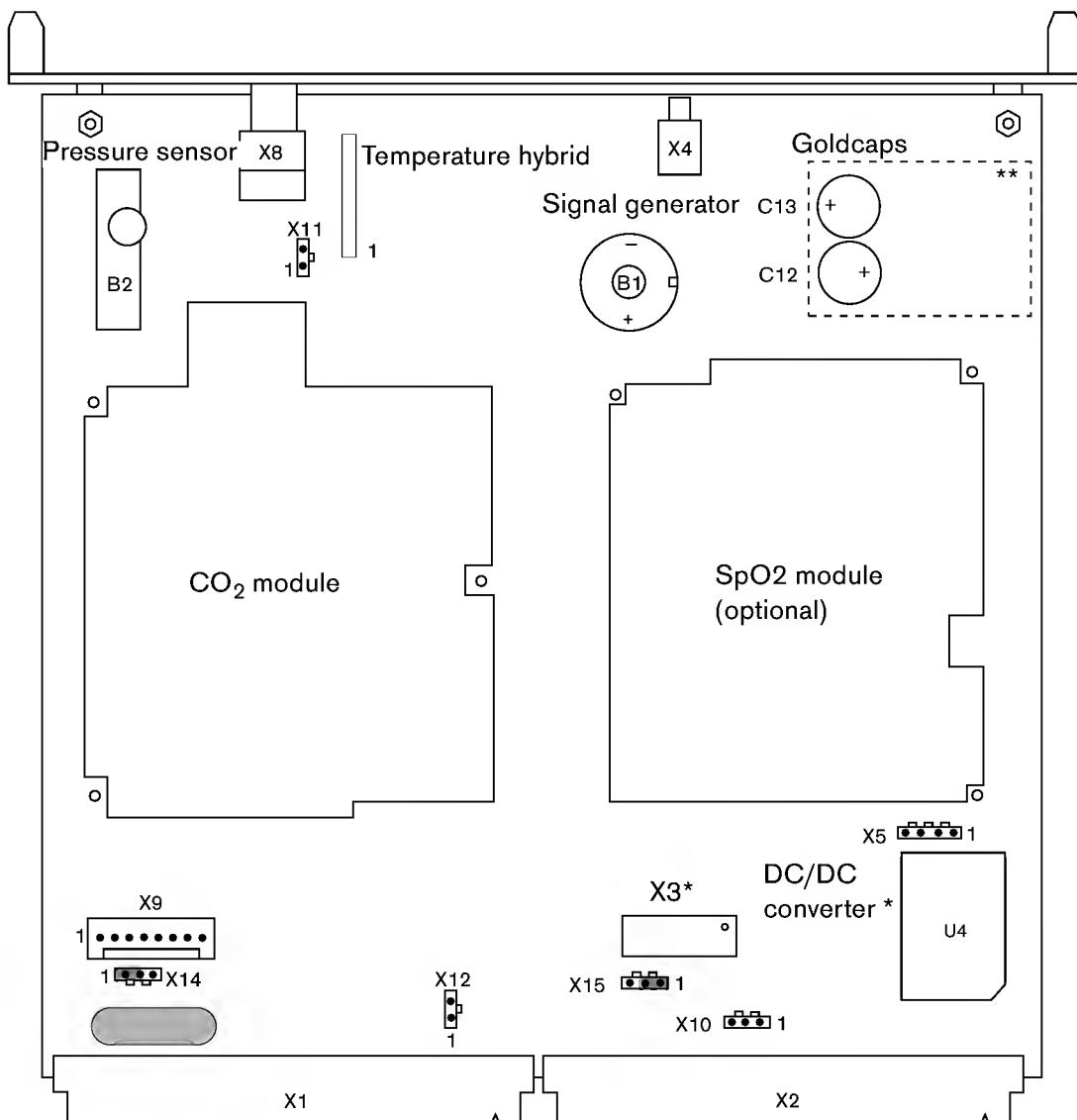
X11			
Pin	Assignment	Pin	Assignment
1	-15 V	2	+15 V

X12			
Pin	Assignment	Pin	Assignment
1	DGND	2	AGND

Jumper X14 RS232 test CO ₂ (pin 1–2 normal, 2–3 test)			
Pin	Assignment	Pin	Assignment
1	X9 Pin 3	3	RXD-CO ₂
2	TXD-CO ₂		Test only possible with the CO ₂ module connected

Jumper X15 RS232 test SpO ₂ (pin 1–2 normal, 2–3 test)			
Pin	Assignment	Pin	Assignment
1	X3 Pin 8	3	RXD-SPO ₂

Jumper X15 RS232 test SpO ₂ (pin 1–2 normal, 2–3 test)			
Pin	Assignment	Pin	Assignment
2	TXD-SPO ₂		



* X3 and the DC/DC converter are integral parts of the optional SpO₂.

** PCB Super gold according to IDM No. 29 (Evita 4 or Evitad 2 dura)

Fig. 22: Component mounting diagram of the CO₂ Carrier PCB

5.3 Replacing the CO₂ Carrier PCB

- Switch the Evita off.
- Remove the CO₂ Carrier PCB.
- Remove the CO₂ module (Power Supply PCB, Processor Board PCB), the SpO₂ module (if available), the connector X3, and the DC/DC converter U4 (part of the optional SpO₂).
- Mount the CO₂ module and the SpO₂ module (if available), the connector X3, and the DC/DC converter U4 (part of the optional SpO₂) on the new CO₂ Carrier PCB.
- Install the new CO₂ Carrier PCB in the Evita.
- Secure the CO₂ Carrier PCB with the screws.
- Check the Evita by following the instructions in the Evita Test Certificate.

5.4 Tests possible in DS mode

5.4.1 Diagnosis mode

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 3.3.2, Diagnosis page "Microprocessor" of "Electronics", page 70.; all displayed voltages are measured on the CO₂ Carrier PCB.

5.4.2 External DS mode using PC

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.4.1, Testing voltages, page 138.

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.4.2, Power pack status, page 140.

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.4.3, Sensors, page 142.

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.4.4, CO₂ measurement data, page 143.

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.4.5, SpO₂ measurement data, page 145.

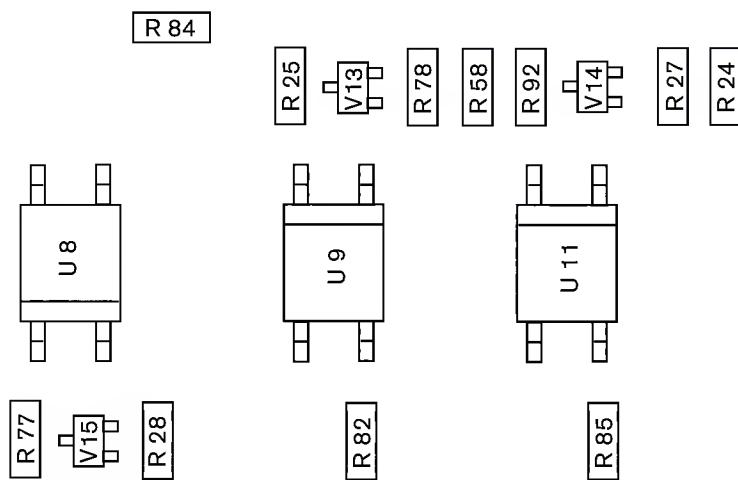
refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.4.6, Horn test, page 147.

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.4.8, Gold-Cap, page 148.

5.5 Conversions

5.5.1 Replacing CO₂ Carrier PCB According to IDM No. 3 (Evita 4)

- Switch unit off.
- Observe electrostatic precautions. Use an ESD protection mat and a wrist strap.
- Dismantle CO₂ Carrier PCB (lowest PCB in the electronics unit).



- Replace resistors R82 and R84 with 511 ohms by 332 ohm resistors (order no. 18 16 144).
If the resistance of R82 and R84 cannot be identified by the serial number, you can determine the ohmic resistance using a multimeter. It is also possible to determine the ohmic resistance by the colour code. You have to replace the resistors R82 and R84 with the code "green – brown – brown – black – black" or "green – brown – brown – black – red".
- Mark the PCB to be replaced with "IDM 3" on the back.
- Assemble the unit ready for operation.
- Switch unit on and activate CO₂ measurement via "alarm limits" and "monitoring".
- Carry out function check in standby mode after 3 minutes.
- Switch to ventilation and call up CO₂ real-time curve.
- Test plausibility of CO₂ real-time curve and etCO₂ measured value by breathing through the cuvette. Alternatively, test CO₂ measurement according to test items 9 to 9.2 of the Test Certificate.
- Check electrical safety following test items 10 to 10.3.1 of the Test Certificate.

**5.5.2 Conversion due to Error Message “Ext. Battery reversed poles”
IDM No. 2 (Evita 2 dura) or IDM No. 19 (Evita 4)**

See IDM: [02/99 Lenke No. 29 replaces IDMs Nos. 11/19/22](#) (Evita 4 or Evita 2 dura)

5.5.3 Conversion for Device Error 02.71.003 IDM No. 2 (Evita 2 dura) or IDM No. 19 (Evita 4)

See IDM: [02/99 Lenke No. 29 replaces IDMs Nos. 11/19/22](#) (Evita 4 or Evita 2 dura)

6 Power Supply PCB (CO₂ measurement)



CAUTION

Electrostatic discharge can damage electronic components. Use an ESD protection mat and a wrist strap when handling electronic modules.

6.1 Power Supply to the Power Supply PCB

J1			
Pin	Assignment	Pin	Assignment
1	+5 V	3	-
2	GND		

6.2 Connector Pin Assignment on the Power Supply PCB

J2 (Inputs/outputs for communication between the Evita and the CO ₂ measurement)			
Pin	Assignment	Pin	Assignment
1	DGND of the CO ₂ measurement	7	TTL-TXD (Evita)
2	RXD with RS232 level (PC)	8	TTL-RXD (Evita)
3	TXD with RS232 level (PC)	10	+5 V output (isolated)

P2 (Inputs/outputs for communication between the PCBs of the CO ₂ measurement)			
Pin	Assignment	Pin	Assignment
1	DGND of the CO ₂ measurement	7	TTL-TXD (Evita)
2	RXD with RS232 level (PC)	8	TTL-RXD (Evita)
3	TXD with RS232 level (PC)		

P4 (Power supply outputs and inputs of the switching signals. The outputs are isolated from the connector J1)

Pin	Assignment	Pin	Assignment
1	+5 V	5	-15 V
2	+8 V	6	+15 V
3	DGND	7	on/off for the +8.5 V (5 V = on)
4	AGND	8	on/off for the +15 V (5 V = on)

6.3 Measuring the Voltages on the Power Supply PCB

You can measure the output voltages of the Power Supply PCB using one of the following two methods.

6.3.1 Printed Circuit Board on Extender Board

- Mount the CO₂ Carrier PCB on an extender board.
- Measure the voltages at the P4 connector (see connector pin assignment).

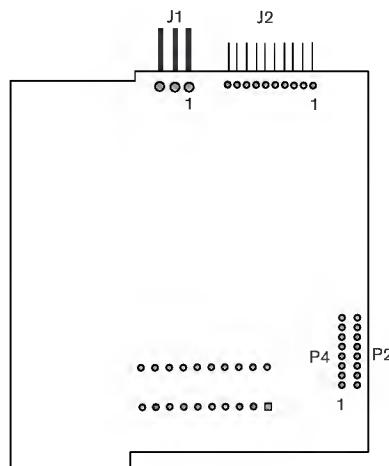


Fig. 23: Power Supply PCB, soldering side

6.3.2 Printed Circuit Board in the Evita

- Insert the CO₂ Carrier PCB into the second slot viewed from top.
- Remove the cover of the Evita (see "Removing the Power Supply Unit").
- Measure the voltages at the P4 connector (see connector pin assignment).

6.4 Test Points on the Power Supply PCB

All voltages are measured at test point DGND. If the board is removed and the 5 V supply is connected, you cannot measure the voltage at test point 3. If you want to measure the voltage at test point 3, you must install a 1-K Ω resistor between pin 1 and pin 8 of the P4 connector.

Test points (Andros PCB)		X6 (Dräger PCB)	
Test point	Assignment	Pin	Assignment
1	DGND	1	TTL-TXD (not assignd)
2	+15 V \pm 0,75 V	2	TTL-RXD
3	+15 V \pm 0,75 V (switched)	3	/
5	+8,5 V \pm 0,5 V	4	DGND
6	-15 V \pm 0,75 V	5	+5 V
7	+5 V \pm 0,25 V	6	8 V-ON-OFF
8	on /off +15 V	7	ON-OFF
9	TTL-RXD	8	+15 V
10	TTL-TXD	9	-15 V
		10	+8 V
		11	OUT-A

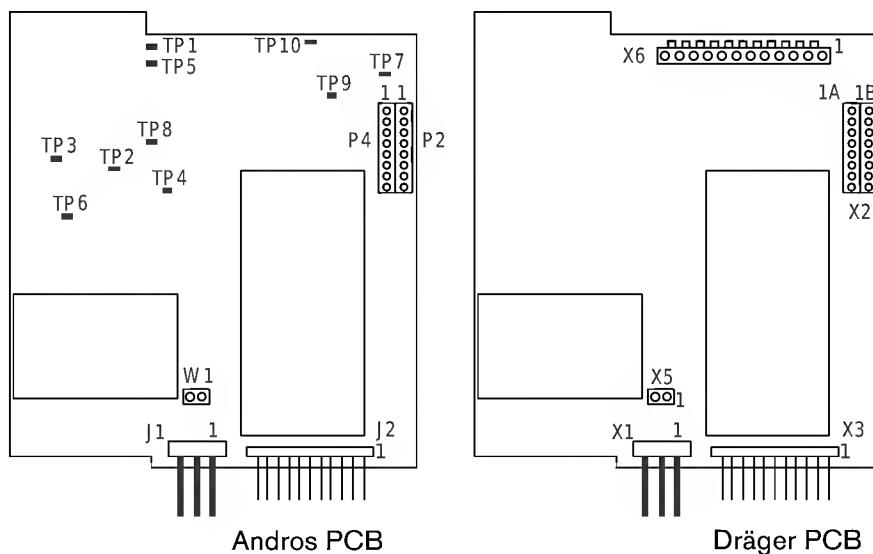


Fig. 24: Components mounting diagram of the Power Supply PCB

6.5 Replacing the Power Supply PCB

- Switch the Evita off.
- Remove the CO₂ Carrier PCB.
- Remove the screws which secure the Power Supply PCB and remove the Power Supply PCB.
- Mount the new Power Supply PCB on the CO₂ Carrier PCB.
- Install the CO₂ Carrier PCB in the Evita.
- Secure the CO₂ Carrier PCB with the screws.
- Check the Evita by following the instructions in the Evita 4/Evita 2 dura Test Certificate.

7 Processor Board PCB (CO₂ measurement)



CAUTION

Electrostatic discharge can damage electronic components. Use an ESD protection mat and a wrist strap when handling electronic modules.

7.1 Power Supply to the Processor Board PCB

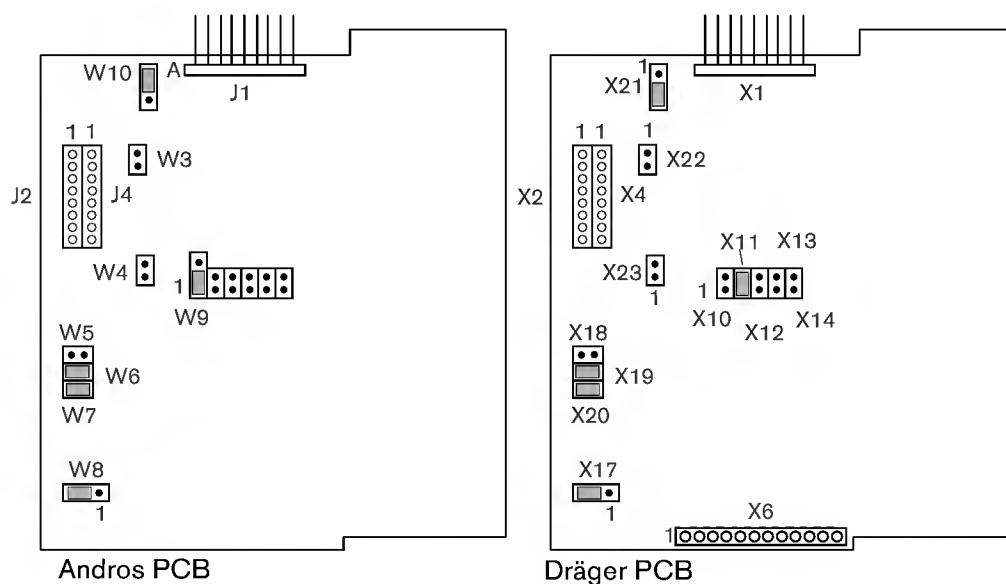
The Processor Board PCB is powered from the Power Supply PCB. The J4 connector of the Processor Board PCB and the P4 connector of the Power Supply PCB are directly interconnected. The power supply must be measured at the P4 connector of the Power Supply PCB (see "Power Supply PCB").

J4			
Pin	Assignment	Pin	Assignment
1	+5 V	5	-15 V
2	+8.5 V	6	+15 V
3	DGND	7	on/off for +8.5 V
4	AGND	8	on/off for +15 V

7.2 Connector Pin Assignment of the Processor Board PCB

J2 (Inputs/outputs for communication between the PCBs of the CO ₂ measurement)			
Pin	Assignment	Pin	Assignment
1	DGND of the CO ₂ measurement	7	TTL-TXD (Evita)
2	RXD with RS232 level (PC)	8	TTL-RXD (Evita)
3	TXD with RS232 level (PC)		

J1 (Connection to the sensor)			
Pin	Assignment	Pin	Assignment
1	AGND	6	DGND
2	MUX (measuring signal from the multiplexer in the sensor)	7	+8.5 V
3	Shield	8	Data (serial data connection between the CPU and the sensor)
4	-15V	9	Clock for synchronization
5	+15 V		



W3 = open
 W4 = open
 W5 = open
 W6 = closed
 W7 = closed
 W8 = 2 - 3
 W9 = 1 - 2 (if applicable)
 W10 = A centre (if applicable)

X10 = open
 X11 = closed
 X12 = open
 X13 = open
 X14 = open
 X17 = 2 - 3 closed
 X18 = open
 X19 = closed
 X20 = closed
 X21 = 2-3 closed
 X22 = open
 X23 = open

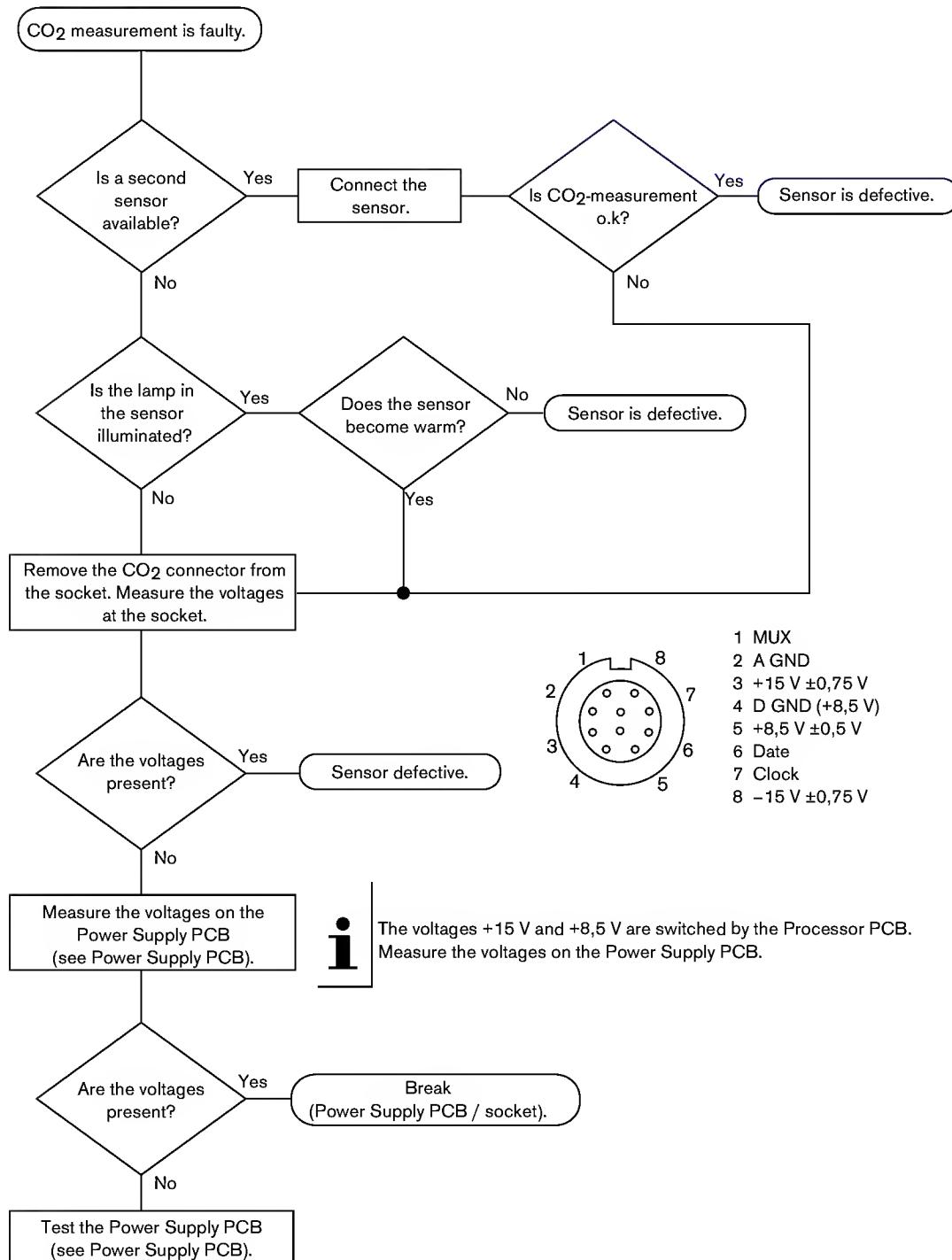
Fig. 25: Components mounting diagram of the Processor Board PCB

7.3 Replacing the Processor Board PCB

- Switch the Evita off.
- Remove the CO₂ Carrier PCB.
- Remove the screws which secure the Processor Board PCB and remove the Processor Board PCB.
- Check the jumper configuration (see old Processor Board PCB or functional description and components layout diagram, if necessary).
- Mount the new Processor Board PCB on the CO₂ Carrier PCB.
- Install the CO₂ Carrier PCB in the Evita.
- Secure the CO₂ Carrier PCB with the screws.
- Check the Evita by following the instructions in the Evita 4/Evita 2 dura Test Certificate.

8 CO₂ Measurement

8.1 Fault Diagnosis Chart



8.2 CO₂ Sensor

The CO₂ sensor can only be repaired in the Lübeck workshop.

The lamp in the CO₂ sensor has an estimated service life of approx. 40,000 hours (about 4 1/2 years of continuous operation). The service life might be reduced if the sensor is dropped or exposed to strong vibrations.

A span-check filter is located in the CO₂ sensor cable. This span-check filter is specifically adapted to the relevant CO₂ sensor. If you have to replace it with a new span-check filter, you must re-adapt the new span-check filter to the CO₂ sensor. Follow these instructions to adapt the new filter:

- Calibrate the CO₂ sensor with test gas.
- Insert the span-check filter into the cuvette.
- Read out the CO₂ value.
- Attach a new clip to the span-check filter whose value is closest to the measured value. A set of clips can be ordered separately.

9 SpO₂ Module (Optional)

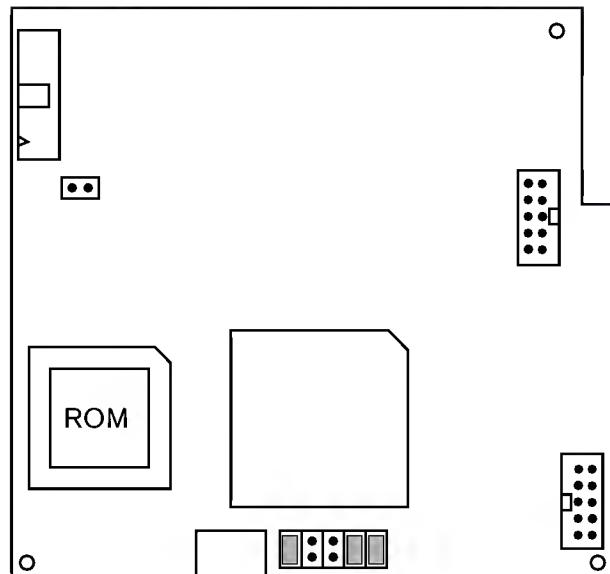


Fig. 26: Component mounting diagram of the optional SpO₂ module

The optional SpO₂ function includes the following parts:

- SpO₂ module with connecting cable for X3.
- DC/DC converter U4 on the CO₂ Carrier PCB.
- Connector X3 on the CO₂ Carrier PCB.

10 Graphics Controller PCB Evita 4



CAUTION

Electrostatic discharge can damage electronic components. Use an ESD protection mat and a wrist strap when handling electronic modules.

10.1 Power Supply to the Graphics Controller PCB

X1 (Sub D connector – power supply only)			
Pin	Assignment	Pin	Assignment
1	+24 V	2	GND

10.2 Connector Pin Assignment of the Graphics Controller PCB

X1 (Sub D connector)			
Pin	Assignment	Pin	Assignment
1	+24 V	9	LS1 (loudspeaker connection +)
2	GND	10	LS2 (loudspeaker connection –)
4	PROM_EN (enable for the programming voltage)		

X2 (Touch)			
Pin	Assignment	Pin	Assignment
1	+5 V	5	RXD
2	GND	8	GND
3	GND	9	DIMPWM (signal to dim the inverter)
4	TXD	10	+5 V (operating voltage for the optocouplers)

X4 (Display signal)			
Pin	Assignment	Pin	Assignment
1	GND	25	GND
22	HSYNCH (horizontal synchronization)	26	GND
23	GND	28	+5 V
24	VSYNCH (vertical synchronization)	32	+12 V

X7 (Display power)			
Pin	Assignment	Pin	Assignment
1	+12 V	5	DIMPWM (signal to dim the inverter)
2	GND	7	+5 V
3	+24 V		

X10 (Background debug mode interface)			
Pin	Assignment	Pin	Assignment
1	GND	5	RESETQ (reset signal)
2	BKPT (break input)	6	IFETCH (status signal from 68332)
3	GND	7	+5 V
4	FREEZE (status signal from 68332)	8	IPIPE (status signal from 68332)

X14 (Membrane keyboard)			
Pin	Assignment	Pin	Assignment
23	GND	27	BUTTON (button of the control knob)
24	+5 V	28	ALARMLED (anode of the alarm LEDs)
25	KN1 (signal 1 from the control knob)	31	LS1 (speaker connection +)

X14 (Membrane keyboard) (Forts.)			
Pin	Assignment	Pin	Assignment
26	KN2 (signal 2 from the control knob)	32	LS2 (speaker connection -)

X5, X15 (Jumper)	
Pin	Assignment
	No function assigned

X20 (Jumper)	
Pin	Assignment
1	+5 V
2	PROM-ENX (signal for burning of the flash EPROMs)

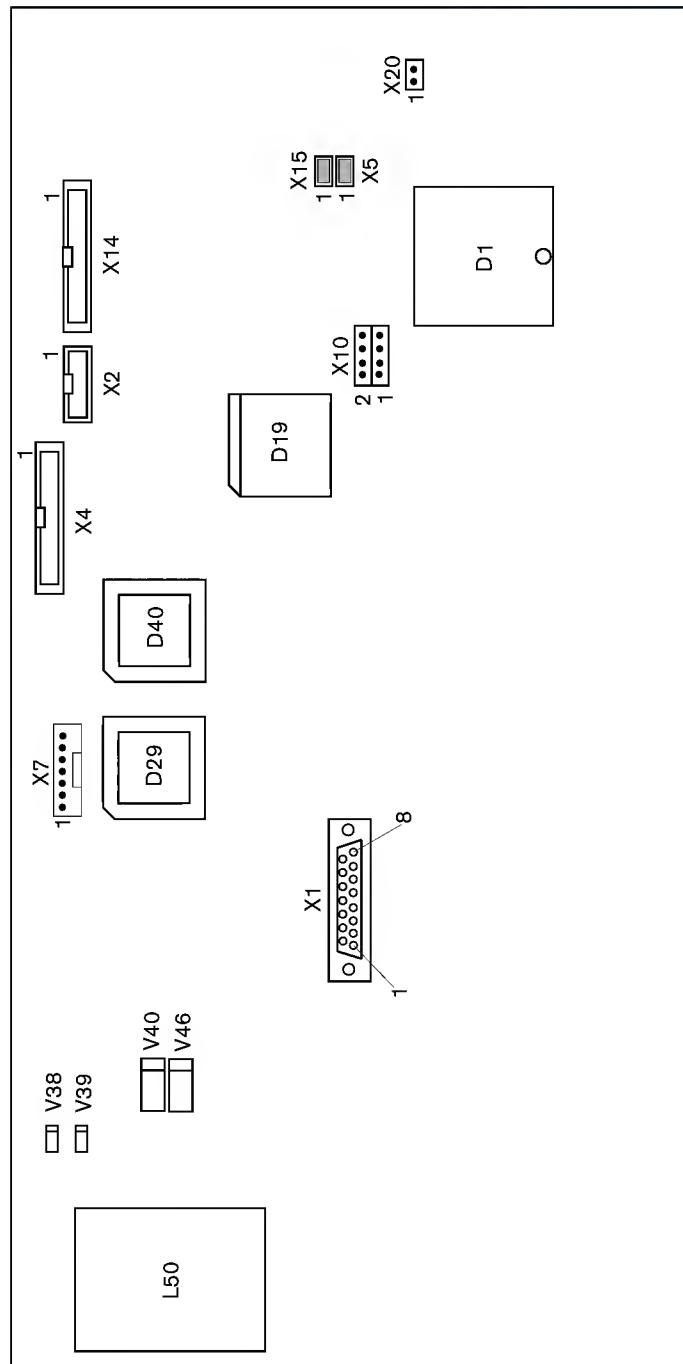


Fig. 27: Components mounting diagram of the Graphics Controller PCB

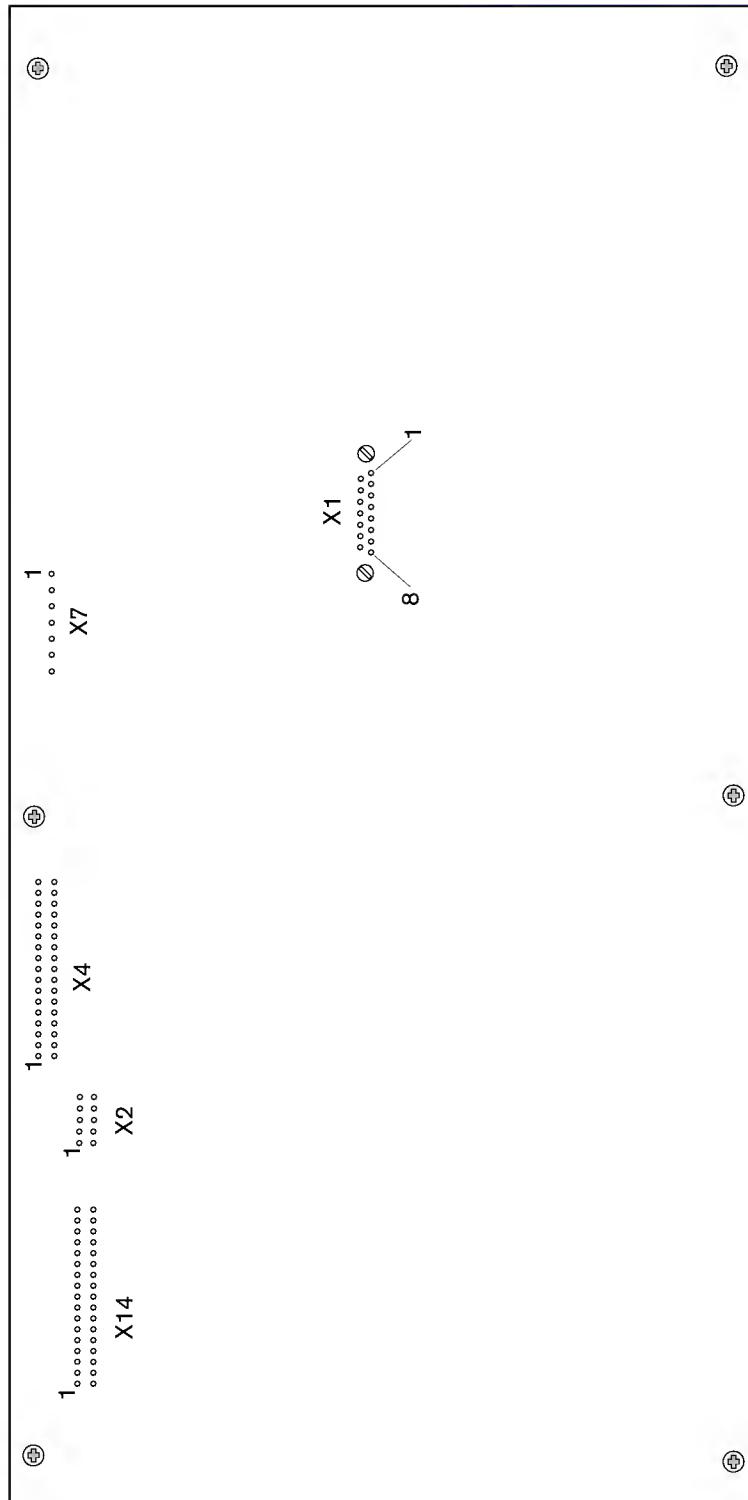


Fig. 28: Soldering side of the Graphics Controller PCB

10.3 Replacing the Graphics Controller PCB

- Switch the Evita 4 off.
- Open the control unit.
- Remove the plug-in connection to the electronics.
- Remove the two hexagon head cap screws at the rear of the control unit.

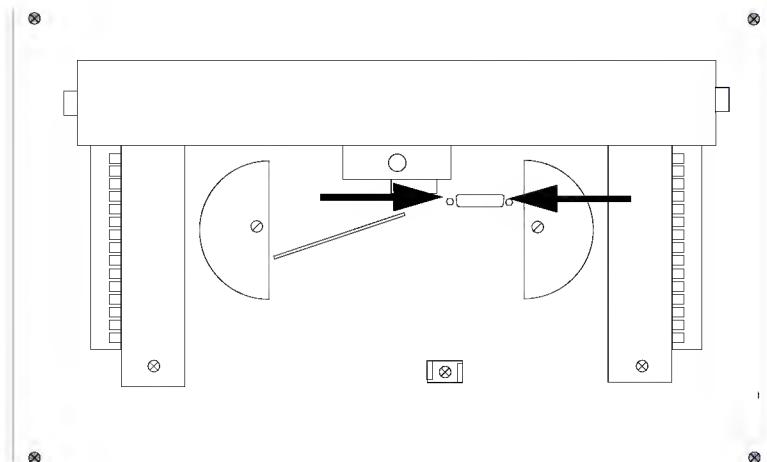


Fig. 29: Rear view of the control unit – dismantling the Graphics Controller PCB

- Remove the six Phillips screws on the Graphics Controller PCB.

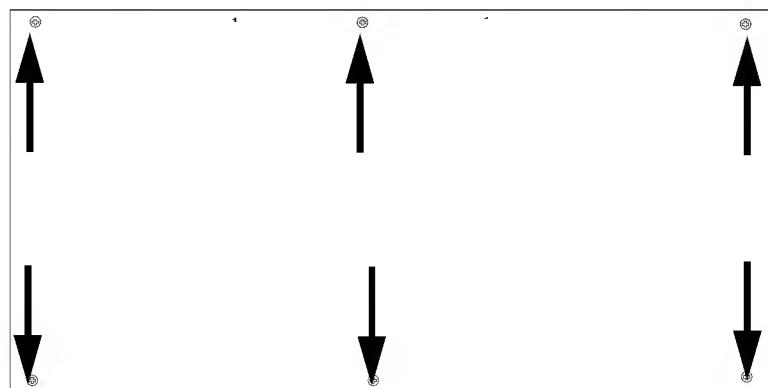


Fig. 30: Soldering side of the Graphics Controller PCB – dismantling the board

- Remove the plug-in connectors from the Graphics Controller PCB.
- Remove the Graphics Controller PCB.
- Remove D29 and D40 from the old Graphics Controller PCB.
- Mount D29 and D40 onto the new Graphics Controller PCB.
- Mount the new Graphics Controller PCB by following the reverse method for dismounting.
- Load the corresponding software into the Graphics Controller PCB.
- Check the Evita 4 by following the instructions in the Evita 4 Test Certificate.

10.4 Tests possible in DS mode

10.4.1 Diagnosis mode

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 3.2.1, Diagnosis page "Microprocessor" of "Front", page 64.

10.4.2 External DS mode using PC

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.5, Testing "Front panel", page 150.

11 Display with DC/AC converter for backlighting Evita 4



CAUTION

Electrostatic discharge can damage electronic components. Use an ESD protection mat and a wrist strap when handling electronic modules.



ATTENTION

The screen goes blank if the backlighting fails

Three different displays are used in the Evita 4. The backlighting differs from version to version

Version 1 from Toshiba (as of 1995):

- Identifier: External DC/AC converter for 2 lamps.

Version 2 from NEC (as of 1996):

- Identifier: Internal DC/AC converter for 1 lamp.

Version 3 from Sharp (as of 1996):

- Identifier: External DC/AC converter for 2 lamps.

Version 0 from Toshiba (as of 1997):

- Identifier: External DC/AC converter for 2 lamps.
- Pre-requisite: Software 2.20, or Software 1.07 (Japan only), or Software 1.08 (U.S.A. only).

11.1 Power Supply to the Display

X7 (Graphics Controller PCB)			
Pin	Assignment	Pin	Assignment
1	+12 V	5	DIMPWM (signal to dim the inverter)
2	GND	7	+5 V
3	+24 V		

11.2 Connector Pin Assignment of the Display

X4 (Graphics Controller PCB)			
Pin	Assignment	Pin	Assignment
1	GND	25	GND
20	BLANK (blanking signal)	26	GND
22	HSYNCH (horizontal synchronization, not in every display type)	28	+5 V
23	GND	32	+12 V
24	VSYNCH (vertical synchronization, not in every display type)		

11.3 Replacing the Display

Example: Toshiba display; replacement is similar for other versions.

- Switch the Evita 4 off.
- Open the control unit.
- Remove the four distance pins A (or nuts, in newer versions).

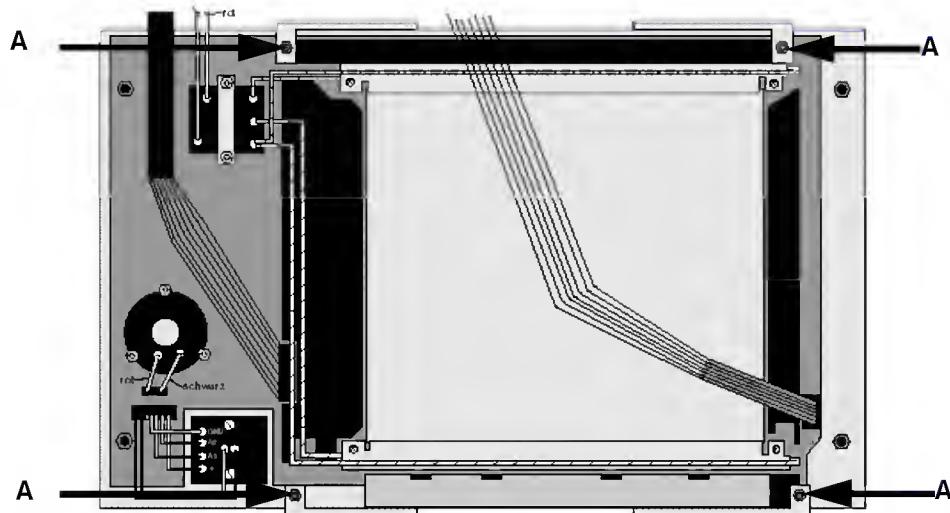


Fig. 31: Dismounting the display (step 1)

- Remove the four angles **B** (not available in newer versions).
- Unsolder the connection **C** (replaced by plug-in connectors in newer versions) from the backlighting.

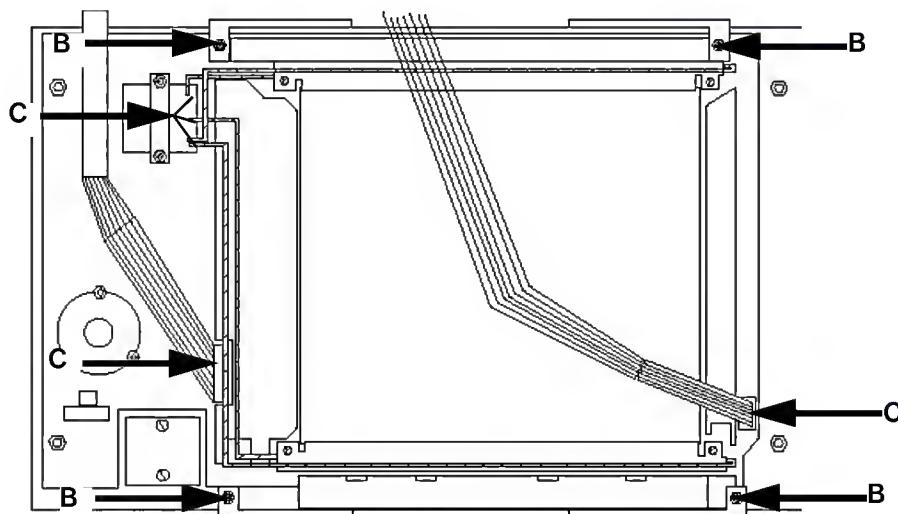


Fig. 32: Dismounting the display (step 2)

- Remove the display.



CAUTION

Dust particles obstruct the display view. Wipe the display and the window with a dust-free cloth before mounting the display. Do not use cleaning agents containing alcohol as these could destroy both display and window.



CAUTION

Alcoholic cleaning agents may damage the display and the window. DO NOT use alcoholic cleaning agents to clean the display or the window.

- Mount the display by following the reverse method used for dismounting.
- Replace D29 and D40 on the Graphics Controller PCB (see “Replacing the Graphics Controller PCB”). D29 and D40 are included in the Display conversion kit.
- Check the Evita 4 by following the instructions in the Evita 4 Test Certificate.

11.4 Testing DC/AC converter for backlighting

The DC/AC converter is to be checked if the entire backlighting fails (=screen blank) and the display responds to service commands refer to section of "Repair Instructions - Service No./Modi, Error list" chapter 9.5.6, Testing of display, page 157.

This converter supplies the lamp (NEC display) or the two lamps (Toshiba or Sharp display) with an AC voltage of approx. 400 V and 50 kHz.

When measuring the voltage with a voltmeter, the voltmeter represents a short circuit for the converter and the voltage collapses.

The following test is easy to implement: Use a screwdriver to create a spark gap at the lamp connections.



CAUTION

Touching the output contacts of the DC/AC converter results in minor burns (HF surgery) and can prove extremely unpleasant.

11.5 Tests possible in DS mode

11.5.1 Diagnosis mode

refer to section of "Repair Instructions - Service No./Modi, Error list" chapter 3.2.1, Diagnosis page "Microprocessor" of "Front", page 64.

This is only possible if display and backlighting are functioning; if not, refer to section of "Repair Instructions - Service No./Modi, Error list" chapter 9.5.6, Testing of display, page 157.

11.5.2 External DS mode using PC

refer to section of "Repair Instructions - Service No./Modi, Error list" chapter 9.5.6, Testing of display, page 157.

12 Backlighting Evita 4



CAUTION

Electrostatic discharge can damage electronic components. Use an ESD protection mat and a wrist strap when handling electronic modules.



IMPORTANT

The screen goes blank if the backlighting fails..

Different displays are used in the Evita.

12.1 Toshiba Display (1995 or later), Version 1

12.1.1 Power Supply to the Backlighting

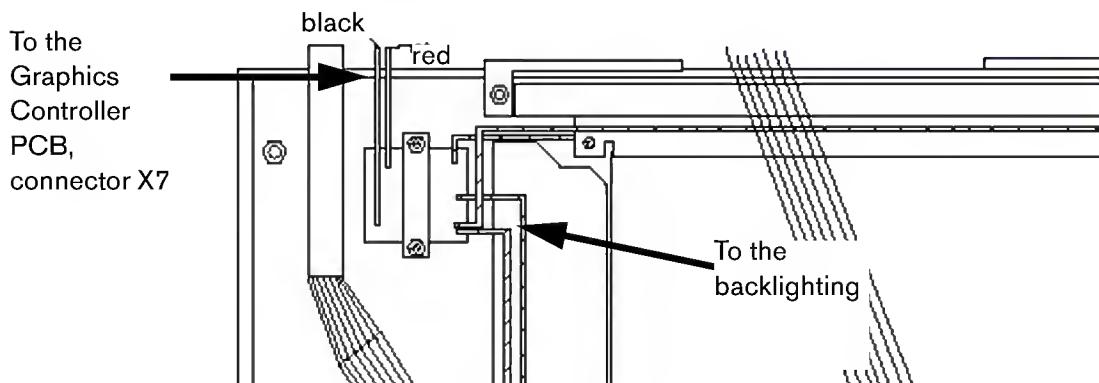


Fig. 33: DC/AC converter with power supply

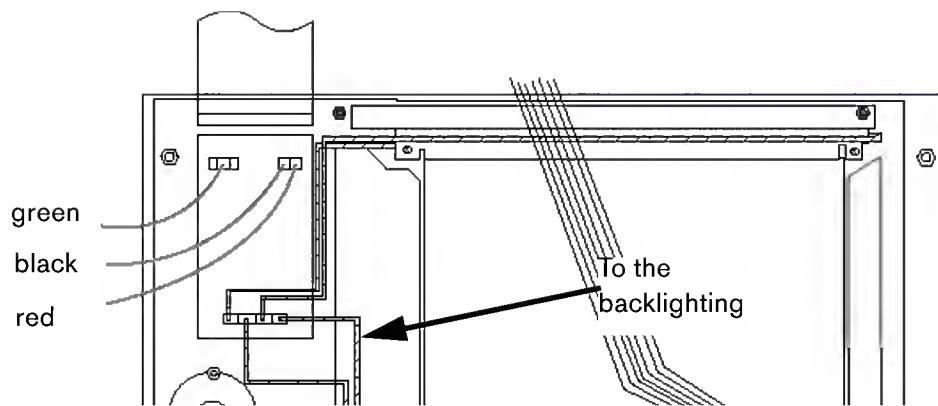


Fig. 34: DC/AC converter board (in newer versions)

12.1.2 Replacing the Backlighting

The order number of the backlighting assembly is related to the specific type of display. Please check which type of display you have before ordering a new backlighting assembly.

- Switch the Evita 4 off.
- Open the control unit.
- Remove the display from the control unit.
- Remove the four screws (see Fig. below).

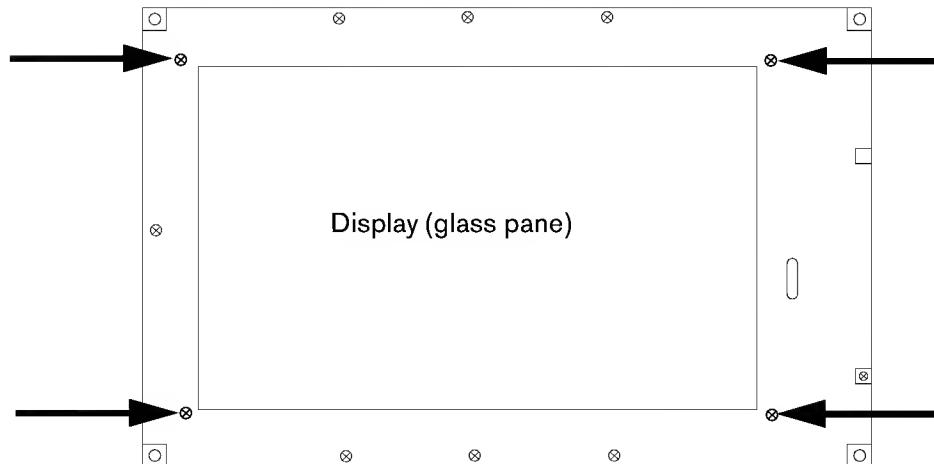


Fig. 35: Display (dismounted)

- Remove the backlighting, along with the light fixture.

**IMPORTANT**

Dust particles may affect the view on the display. Before mounting the display, clean the display and the window with a lint-free cloth.

**CAUTION**

Alcoholic cleaning agents may damage the display and the window. DO NOT use alcoholic cleaning agents to clean the display or the window.

- Mount the new light fixture by following the reverse method used for dismounting.
- Check the Evita 4 by following the instructions in the Evita 4 Test Certificate.

12.2 NEC Display (1996 or later), Version 2

NEC display characteristics:

- Display with integrated DC/DC transformer with one lamp for backlighting. The lamp can be replaced after dismounting the display.

12.3 Sharp Display (1996 or later), Version 3

- Display with external DC/DC transformer with two lamps for backlighting. The lamps can be replaced after dismounting the display.

12.4 Toshiba Display (1997 or later), Version 0

Toshiba display characteristics:

- Display with external DC/DC transformer with two lamps for backlighting. The lamps can be replaced after dismounting the display.

13 Touchscreen/Window Evita 4



CAUTION

Electrostatic discharge can damage electronic components. Use an ESD protection mat and a wrist strap when handling electronic modules.

13.1 Power Supply to the Touchscreens

X2 (Graphics Controller PCB)			
Pin	Assignment	Pin	Assignment
1	+5 V	5	RXD
2	GND	8	GND
3	GND	9	DIMPWM (signal to dim the inverter)
4	TXD	10	+5 V (operating voltage for the optocouplers)

13.2 Replacing the Touchframe

- Switch the Evita 4 off.
- Open the control unit.
- Remove the display.
- Remove the four distance pins.

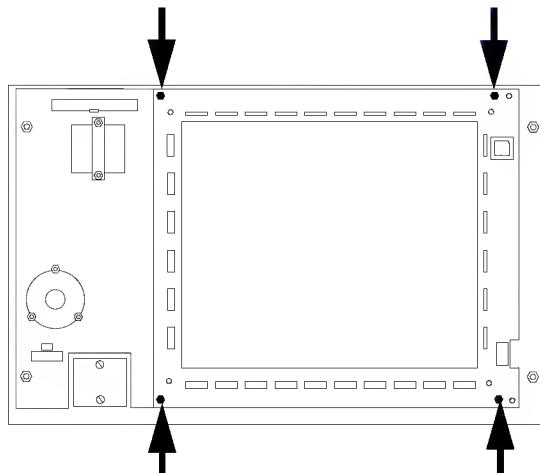


Fig. 36: Touchscreen

- Remove the touchscreen.



IMPORTANT

Dust particles may affect the view on the display. Before mounting the display, clean the display and the window with a lint-free cloth.



CAUTION

Alcoholic cleaning agents may damage the display and the window. DO NOT use alcoholic cleaning agents to clean the display or the window.

- Mount the touchscreen by following the reverse method used for dismounting.
- Check the Evita 4 by following the instructions in the Evita 4 Test Certificate.

13.3 Tests possible in DS mode

13.3.1 Diagnosis mode

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 3.2, "Front" diagnosis, page 64. under IR-touch

13.3.2 External DS mode using PC

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.5.5, Testing of touchscreen, page 155.

13.4 Replacing the Window

- Switch the Evita 4 off.
- Open the control unit.
- Remove the display.
- Remove the touchframe.
- Remove the window.

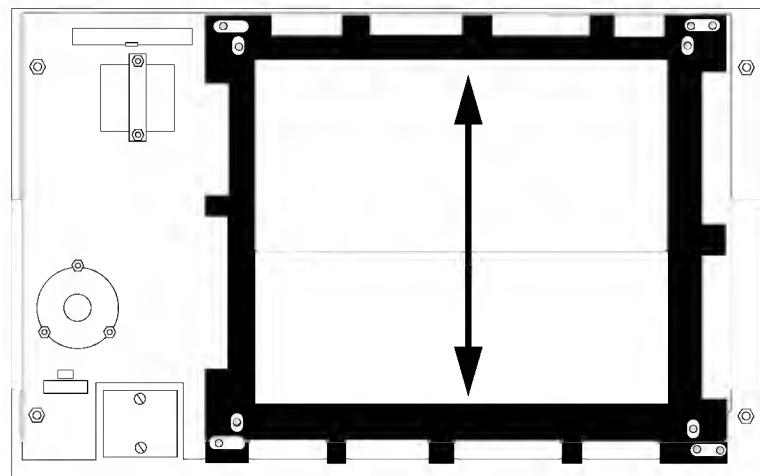


Fig. 37: Window

**IMPORTANT**

Dust particles may affect the view on the display. Before mounting the display, clean the display and the window with a lint-free cloth.

**CAUTION**

Alcoholic cleaning agents may damage the display and the window. DO NOT use alcoholic cleaning agents to clean the display or the window.

- Mount the window by following the reverse method used for dismounting.
- Check the Evita 4 by following the instructions in the Evita 4 Test Certificate.

14 7-Segment PCB Evita 2 dura

14.1 Voltage Supply to the 7-Segment PCB

14.1.1 X1 Connector on the 7-Segment PCB

Pin	Assignment
32/34	+5 V
27/29/31/33	GND
26/28/30	ULED +3 V to +5 V (LEDs dark or bright, selectable with the "bright/dark" key)

14.2 7-Segment PCB Repair Information

– No entries –

14.3 7-Segment PCB Component Layout Diagram

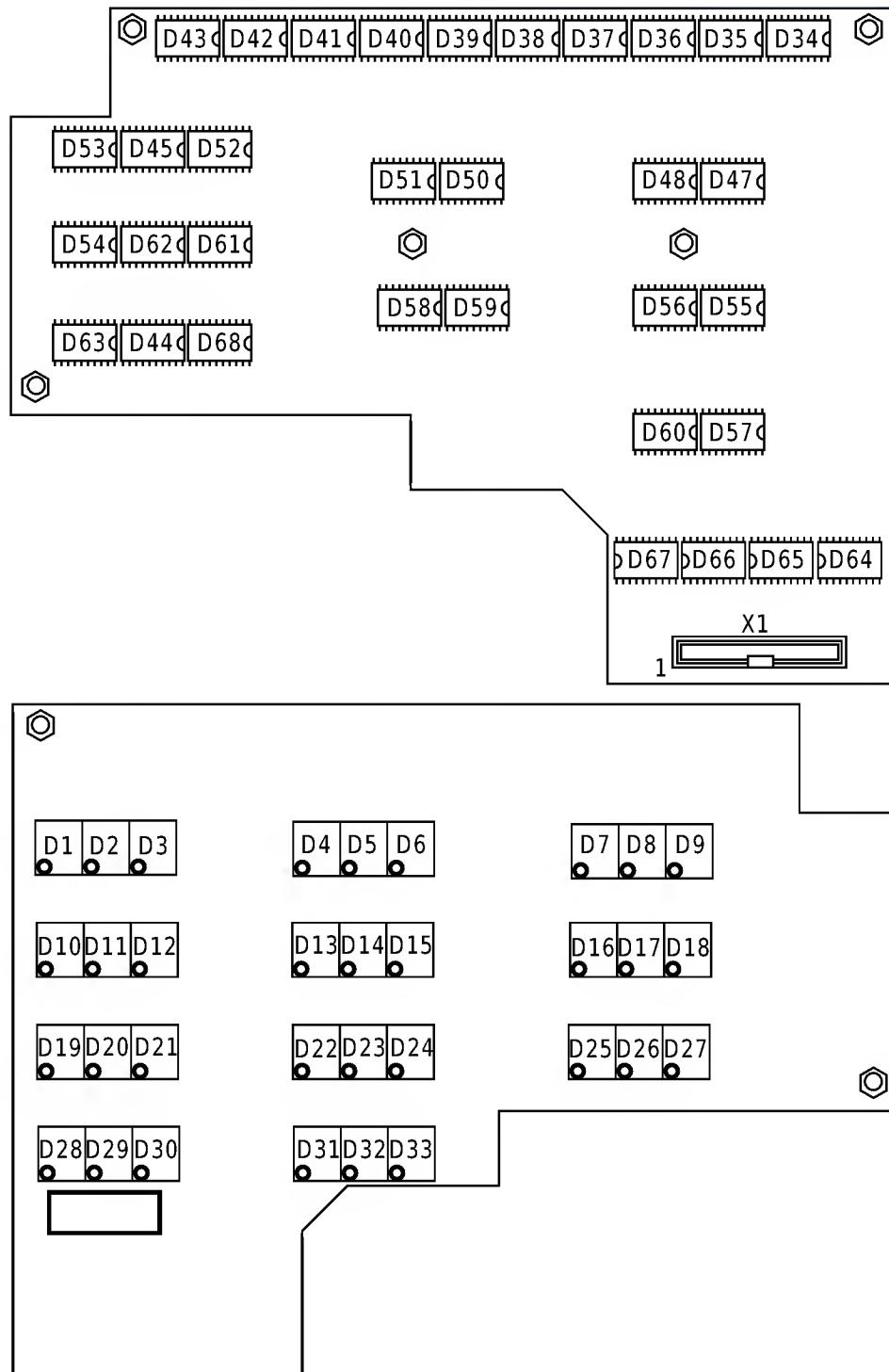


Fig. 38: 7-Segment PCB assembly

15 Frontpanel PCB Evita 2 dura

15.1 Voltage Supply to the Frontpanel PCB

15.1.1 X1 Connector on the Frontpanel PCB to the Electronics

Pin	Assignment
1	+24 V
2	AGND
3/11	+5 V
7/14	GND

15.2 Voltage Supply to Peripheral Equipment

15.2.1 X2 Connector on the Frontpanel PCB to the 7-Segment PCB

Pin	Assignment
26/28/30	ULED +3 V to +5 V (LEDs dark or bright, selectable with the "bright/dark" key)
27/29/31/33	GND
32/34	+5 V

15.2.2 X3 Connector on the Frontpanel PCB to the Membrane Keyboard

Pin	Assignment
1/2/3/4	+5 V
33/37	+24 V (via 2 resistors of $1\text{ K}\Omega$ each)

15.2.3 X5 Connector on the Frontpanel PCB to the Control Knob

Pin	Assignment
1/2	GND
6	+5 V

15.2.4 X7 Connector on the Frontpanel PCB to the display

Pin	Assignment
8/10/12/14/16/1 8/20/22	GND
24/26	UBKL +13 V (display operating voltage, delayed when switching on the Evita 2 dura)
28/30	+5 V
32	-UK -32 V to -35 V, depending on contrast setting of the display
34	+UK +32 V to +35 V, depending on contrast setting of the display

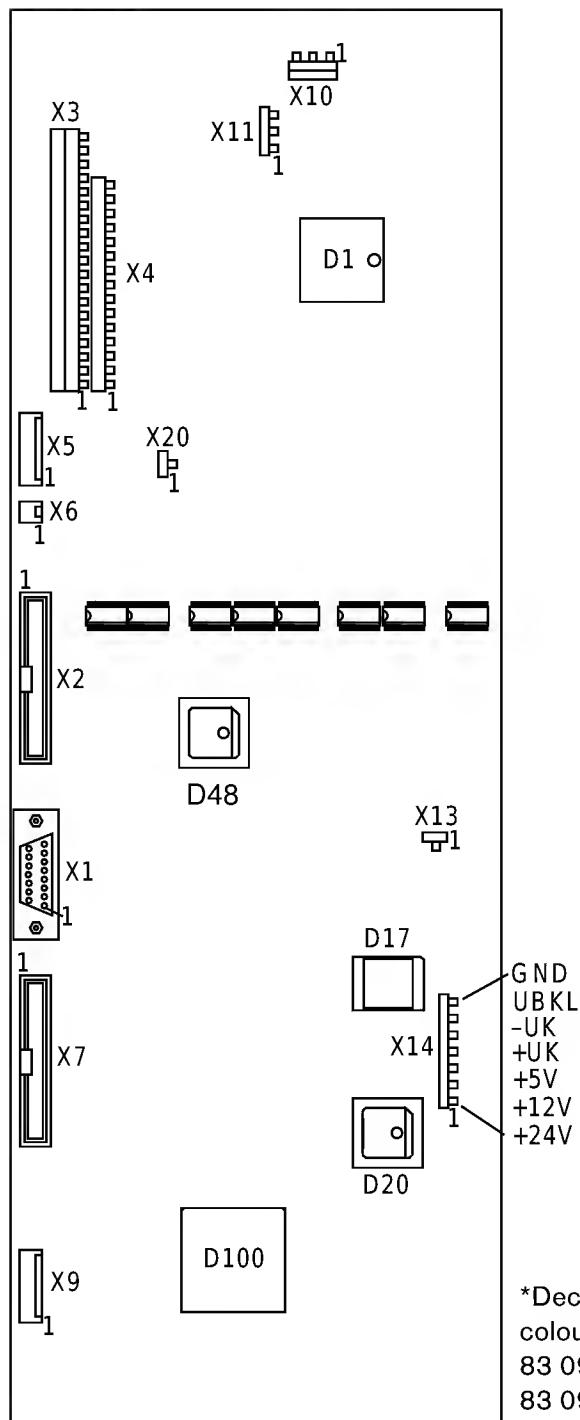
15.2.5 X9 Connector on the Frontpanel PCB to the DC/AC Transformer

Pin	Assignment
1	+24 V
4	+5 V
5	UBKL
7	GND

15.3 Front Panel PCB Repair Information

- Decoder D48 (only present in colour display option) should be taken from the old Frontpanel PCB and mounted on the new Frontpanel PCB.
- After replacing a printed circuit board, download the respective software into the Frontpanel PCB.

15.4 Frontpanel PCB Component Layout Diagram



*Decoder D48 only available in the optional colour display.
83 09 124 for NEC display
83 09 176 for Sharp display

Fig. 39: Frontpanel PCB assembly

16 Pneumatics Controller PCB



CAUTION

Electrostatic discharge can damage electronic components. Use an ESD protection mat and a wrist strap when handling electronic modules.



CAUTION

Risk of burns when operating the system with the rear panel (heat sink) disassembled. Do not operate the system for longer periods of time with the rear panel disassembled.

16.1 Power Supply to the Pneumatics Controller PCB

X1			
Pin	Assignment	Pin	Assignment
6c	+15 V	11c	AGND
7c	-15 V	12c	DGND
8c	+24 V		
14c	+5 V		

16.2 Connector Pin Assignment of the Pneumatics Controller PCB

X2 (Background debug mode interface)			
Pin	Assignment	Pin	Assignment
1	DGND	5	RESQ
2	BKPT	6	IFETCH
3	DGND	7	+5 V
4	FREEZE	8	IPIPE

X3 (Test points)			
Pin	Assignment	Pin	Assignment
1	+5 V-A	5	+15 V-A
2	-5 V-A	6	+10 V-A
3	-15 V-A	7	AGND
4	+15 V-C		

X4 (Flow sensor)			
Pin	Assignment	Pin	Assignment
1	FGND	5	H-DR-OUT2
2	R-121-OUT	6	U-SENSOR
3	K-DR-OUT	7	H-DR-OUT1
4	R-15-OUT		

X5 (PEEP/PIP valve)			
Pin	Assignment	Pin	Assignment
1	5 V-B	2	PEEP-OUT

X6 (O ₂ sensor)			
Pin	Assignment	Pin	Assignment
1	+15 V-B	3	O2-IN
2	AGND	4	-15 V-A

X7 (Inspiration/expiration pressure sensor)			
Pin	Assignment	Pin	Assignment
1	AGND	3	PEXP
2	PINSP	4	+15 V-F

X8 (Inspiration/expiration pressure sensor)

Pin	Assignment	Pin	Assignment
1	AGND	3	PEXP
2	PINSP	4	+15 V-E

X9 (Oesophagus/pressure aux pressure sensor)

Pin	Assignment	Pin	Assignment
1	AGND	3	PAUX
2	POESO	4	+15 V-D

X10 (Pressure aux/oesophagus pressure sensor)

Pin	Assignment	Pin	Assignment
1	AGND	3	PEXSP
2	PINSP	4	+15 V-G

X11 (Test points)

Pin	Assignment	Pin	Assignment
1	DGND	3	+5 V
2	-		

X12 (Flow sensor switch)

Pin	Assignment	Pin	Assignment
1	FLOW-S-POS	2	DGND

X13 (Fan and heating)

Pin	Assignment	Pin	Assignment
1	+24 V-A	2	AGND

X15 (PEEP valve current test points)

Pin	Assignment	Pin	Assignment
1	AGND	2	IPEEP

X17 (Airway pressure signals test points)

Pin	Assignment	Pin	Assignment
1	POESO	4	PAUX
2	PEXP	5	AGND
3	PINSP		

X18 (ADC test point)

Pin	Assignment	Pin	Assignment
1	ADCSIG	2	AGND

X19 (Test points)

Pin	Assignment	Pin	Assignment
1	O ₂ -IN	6	P-O2
2	-15 V-B	7	AGND
3	+15 V-B	8	F-SIG
4	AGND	9	F-O
5	P-AIR	10	F-INOP

X20 (Flash EPROM programming voltage test points)

Pin	Assignment	Pin	Assignment
1	DGND	2	VPP

X21 (Test points)

Pin	Assignment	Pin	Assignment
1	+24 V-A	2	AGND

X24 (CAN terminating resistor jumper)

Pin	Assignment	Pin	Assignment
1	CAN-H	2-3	CAN-L-121R

X30 (O₂/AIR solenoid valve)

Pin	Assignment	Pin	Assignment
1	V0	2	+24 V-A

X31 (Nebulizer solenoid valve)

Pin	Assignment	Pin	Assignment
1	V1	2	+24 V-A

X32 (Venting solenoid valve)

Pin	Assignment	Pin	Assignment
1	V2	2	+24 V-A

X33 (Pressure sensor calibration inspiration solenoid valve)

Pin	Assignment	Pin	Assignment
1	V3	2	+24 V-A

X34 (Pressure sensor calibration expiration solenoid valve)

Pin	Assignment	Pin	Assignment
1	V4	2	+24 V-A

X35 (O₂ calibration solenoid valve)

Pin	Assignment	Pin	Assignment
1	V5	2	+24 V-A

X36 (Spare for extension)

Pin	Assignment	Pin	Assignment
1	V6	2	+24 V-A

X37 (Spare for extension)

Pin	Assignment	Pin	Assignment
1	V7	2	+24 V-A

X38 (Spare for extension)

Pin	Assignment	Pin	Assignment
1	V8	2	+24 V-A

X39 (Spare for extension)

Pin	Assignment	Pin	Assignment
1	V9	2	+24 V-A

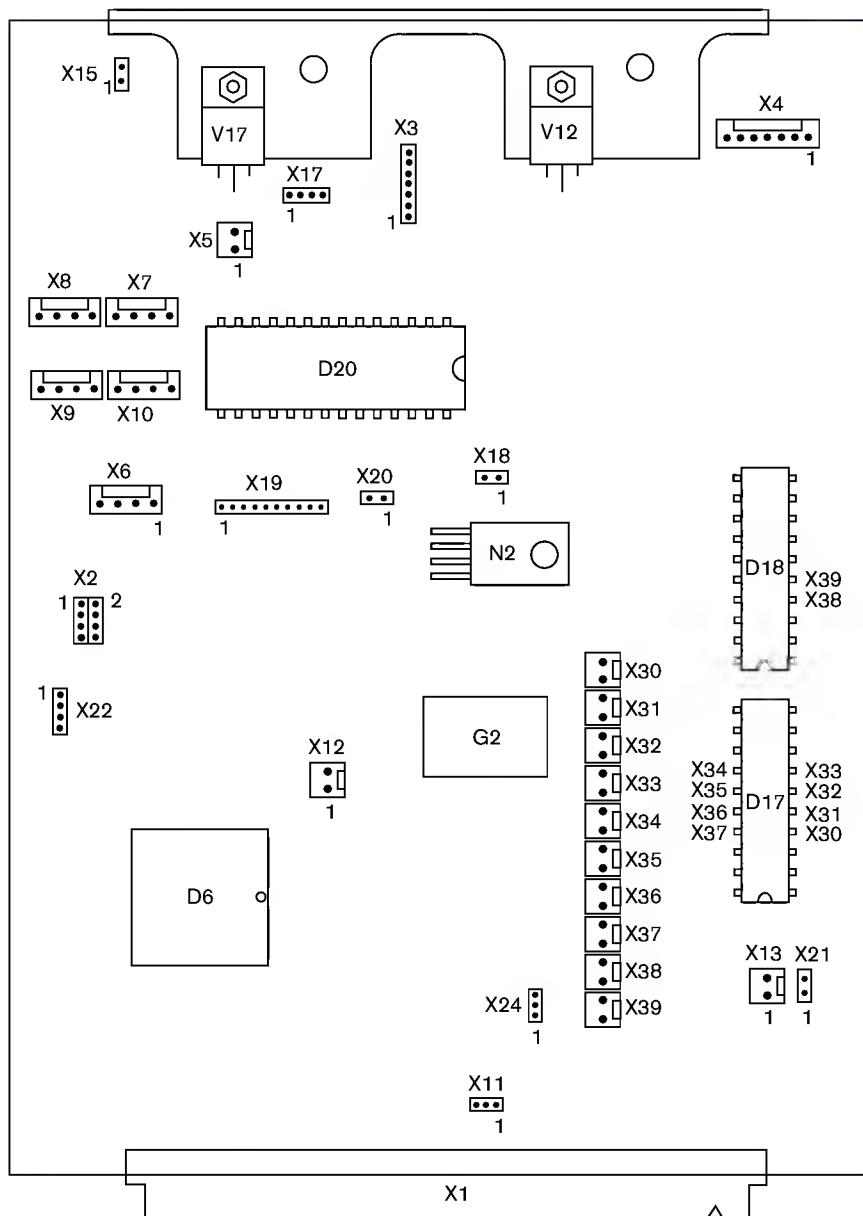


Fig. 40: Component mounting diagram of the Pneumatics Controller PCB

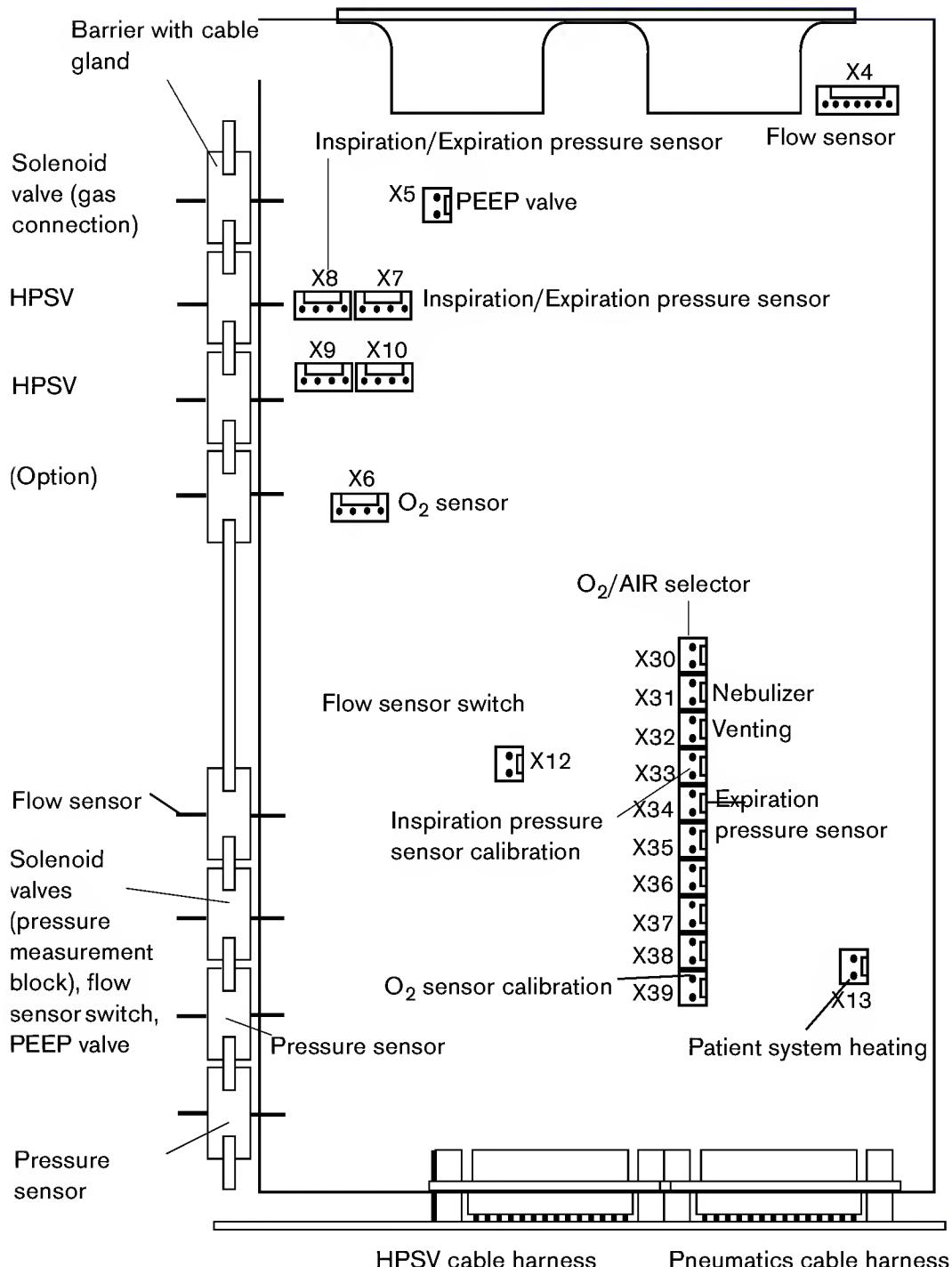


Fig. 41: Pneumatics Controller PCB connector configuration

16.3 Replacing the Pneumatics Controller PCB

- Switch the Evita off.
- Fold up the electronics assembly (see “Opening the Evita 4”).
- Remove the three Phillips screws **C**.
- Loosen the six Phillips screws **B**.

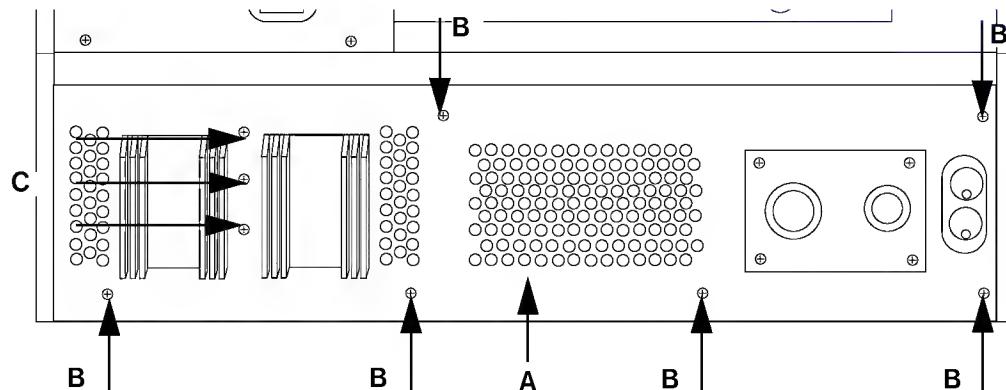


Fig. 42: Rear view (rear panel fitted)

- Remove the rear panel **A**.
- Note down the location of the plug-in connectors of the Pneumatics Controller PCB.
- Remove the plug-in connectors from the Pneumatics Controller PCB.
- Remove the Pneumatics Controller PCB.

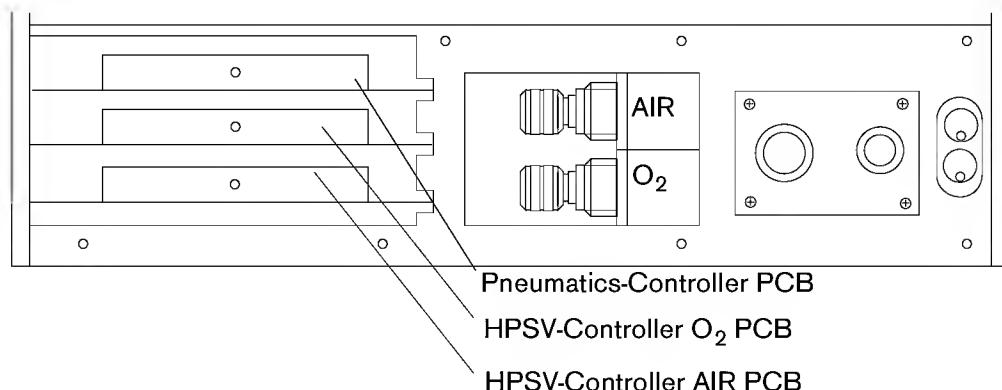


Fig. 43: Rear view (rear panel removed)

- Mount the new Pneumatics Controller PCB by following the reverse method used for dismounting.
- Load the relevant software into the Pneumatics Controller PCB.
- Mount the rear panel.
- Calibrate the PEEP valve (see "Calibrating the PEEP Valve").
- Check the Evita by following the instructions in the Evita 4/Evita 2 dura Test Certificate.

16.4 Tests possible in DS mode

16.4.1 Diagnosis mode

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 3.4, "Pneumatic" diagnosis, page 74.

16.4.2 External DS mode using PC

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.3.1, Valve switching, page 128.

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.3.2, Mixer, page 129.

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.3.3, Setpoint input for PEEP valve, page 129.

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.3.4, Sensors, page 130.

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.3.5, Voltages, page 134.

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.3.6, Calibration, page 136.

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.3.7, CPU, page 137.

17 HPSV Controller PCB



CAUTION

Electrostatic discharge can damage electronic components. Use an ESD protection mat and a wrist strap when handling electronic modules.



CAUTION

Risk of burns when operating the system with the rear panel (heat sink) disassembled. Do not operate the system for longer periods of time with the rear panel disassembled.

17.1 Power Supply to the HPSV Controller PCB

X1			
Pin	Assignment	Pin	Assignment
5c	+12 V	11c	AGND
6c	+15 V	12c	DGND
7c	-15 V		
14c	+5 V		

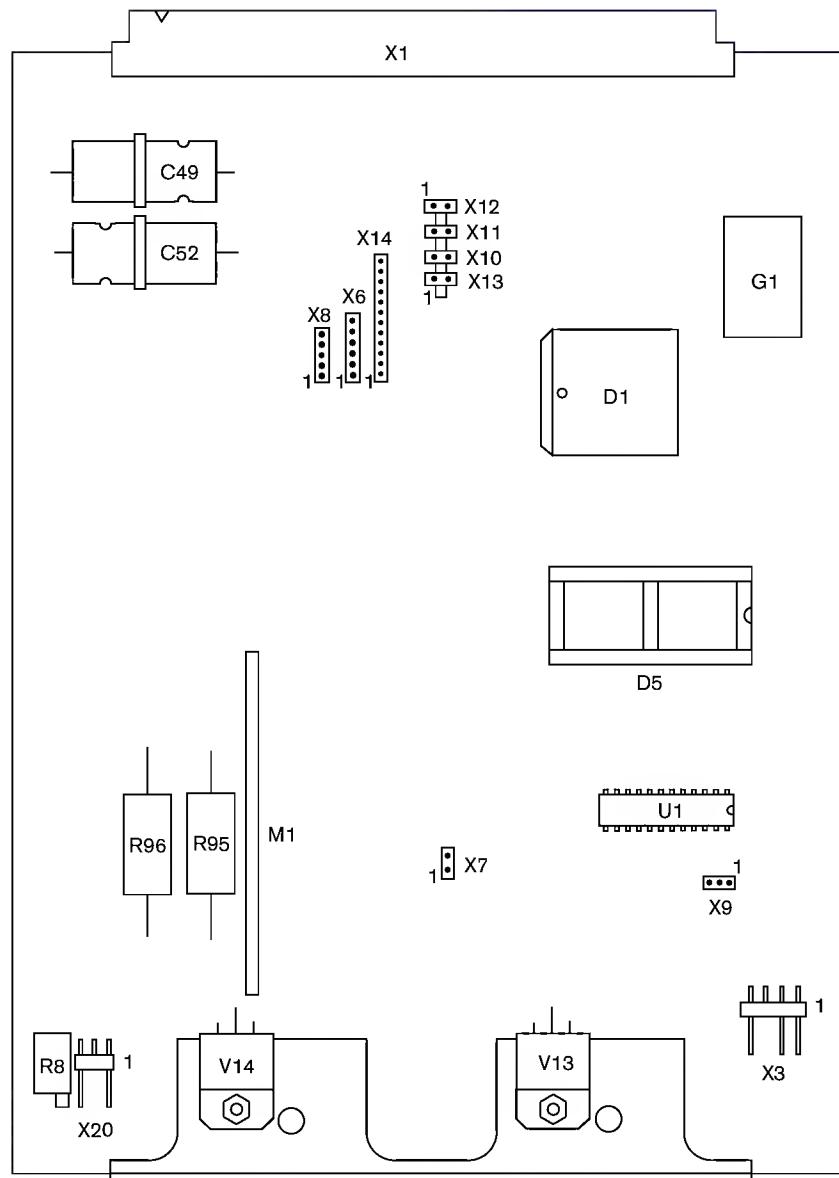


Fig. 44: Component mounting diagram of the HPSV Controller PCB

17.2 Replacing the HPSV Controller O₂/AIR PCB

- Switch the Evita off.
- Remove the Phillips screws A.
- Loosen the Phillips screws B.

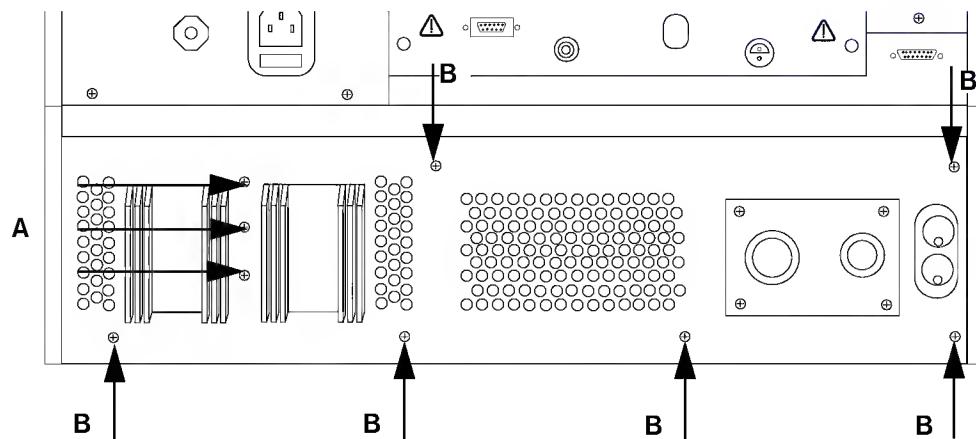


Fig. 45: Rear view (rear panel fitted)

- Remove the rear panel.
- Remove the HPSV Controller PCB.

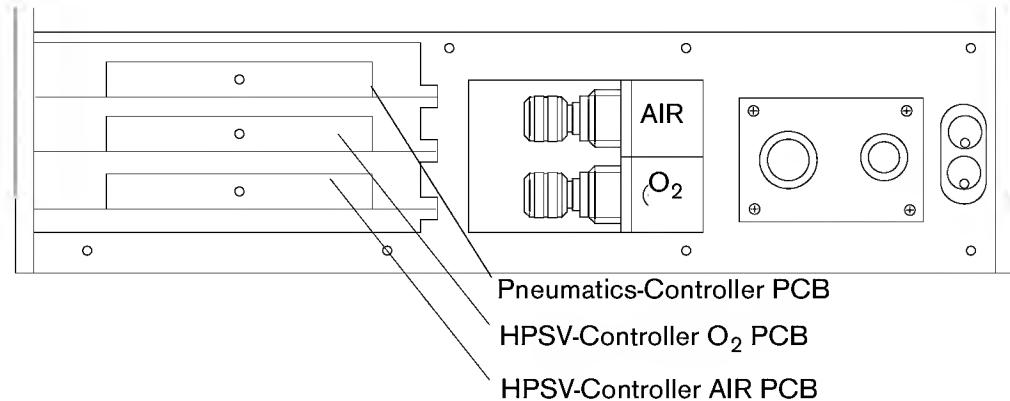


Fig. 46: Rear view (rear panel removed)

- Mount the new HPSV Controller PCB by following the reverse method used for dismounting.
- Check the Evita by following the instructions in the Evita 4/Evita 2 dura Test Certificate.

17.3 Notes Relating to Trouble Shooting

refer to "Repair Instructions - Pneumatic Components chapter 4.4, Troubleshooting in Mixer, page 17.

17.4 Tests possible in DS mode

17.4.1 Diagnosis mode

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 3.4.1, Diagnosis page "Valves" of "Pneumatics", page 74.

17.4.2 External DS mode using PC

refer to section of "Repair Instructions - Service No./ Modi, Error list" chapter 9.3.2, Mixer, page 129.